A

POCKET-BOOK FOR CHEMISTS,

CHEMICAL MANUFACTURERS, METALLURGISTS, DYERS, DISTILLERS, BREWERS, SUGAR REFINERS, PHOTOGRAPHERS, STUDENTS, ETC., ETC.

BY

THOMAS BAYLEY, Assoc. R.C.Sc.I.,

ANALYTICAL AND CONSULTING CHEMIST AND ASSAYER.

FOURTH EDITION.

London: E. & F. N. SPON, 125, STRAND.

New York: 35, MURRAY STREET.

1886.

PREFACE.

In the course of a varied analytical practice I have often felt the want of a collection, in a convenient form, of factors, atomic weights, and other useful data. To supply this want, I have collected the matter which in every-day experience proved to be useful, and the result is this little work.

In offering it to chemists, the author has no expectation that it will be found faultless; but he hopes from the care with which the manuscript was prepared, and from the rigorous comparison with the original sources to which the proofs were submitted, that the book will prove a trustworthy companion to the working chemist, and an efficient aid to the student in the laboratory. For the use of the latter, certain portions have been especially introduced; such are the analytical tables and the part on chemical calculation; in constructing the former, the methods were chosen not so much because of their intrinsic superiority, but because, while being on the whole as good as others, they are, owing to several circumstances, perhaps the most widely used in school laboratories. For the greater part of the matter relating to solubility, I am indebted to Storer's 'Dictionary of Solubilities,' and for the Table of Boiling Points and Vapour Densities to Watts' 'Dictionary.' To enumerate the sources both English and foreign that have contributed to the remainder of the work would be impossible; but I cannot neglect this opportunity of expressing my obligations to the authors and my thanks to a few personal friends who have aided me, especially to Mr. Dawson, not only for his contribution of a very complete table for converting grams and grains, but also for aid in preparing the plate of comparisons. To Messrs. Jackson, of the Barbican, also, I am indebted for assistance in preparing the list of prices.

The chart on page vi shows the strength of solutions of substances in common use; such a graphic method of representation has this advantage over tables, that it renders calculations unnecessary; whereas, unless the numbers found by experiment are identical with those in the tables, which rarely happens, a calculation must be made when the latter are used.

The greater number of the tables have been printed as they were found scattered throughout the length and breadth of chemical literature; others are compilations of useful matter published for the first time in the present form.

In conclusion, I ask those who use this little book to favour me by pointing out any accidental errors they may meet with, and, by communicating suggestions, to aid me in a labour of love—the production of a Pocket-Book for Chemists, at once complete, handy, useful, and accurate.

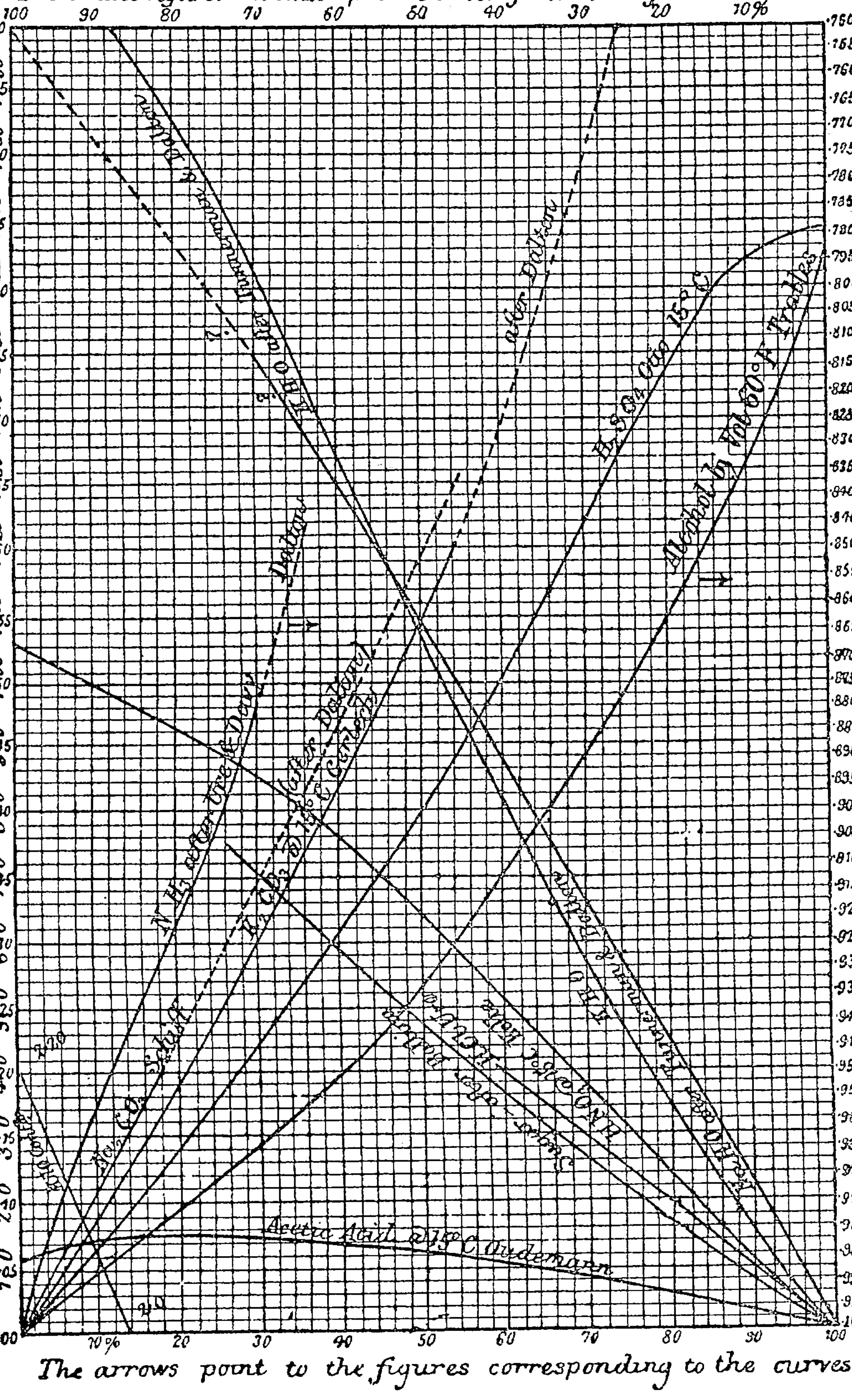
THOMAS BAYLEY.

Jan. 1886.

SYNOPSIS OF CONTENTS.

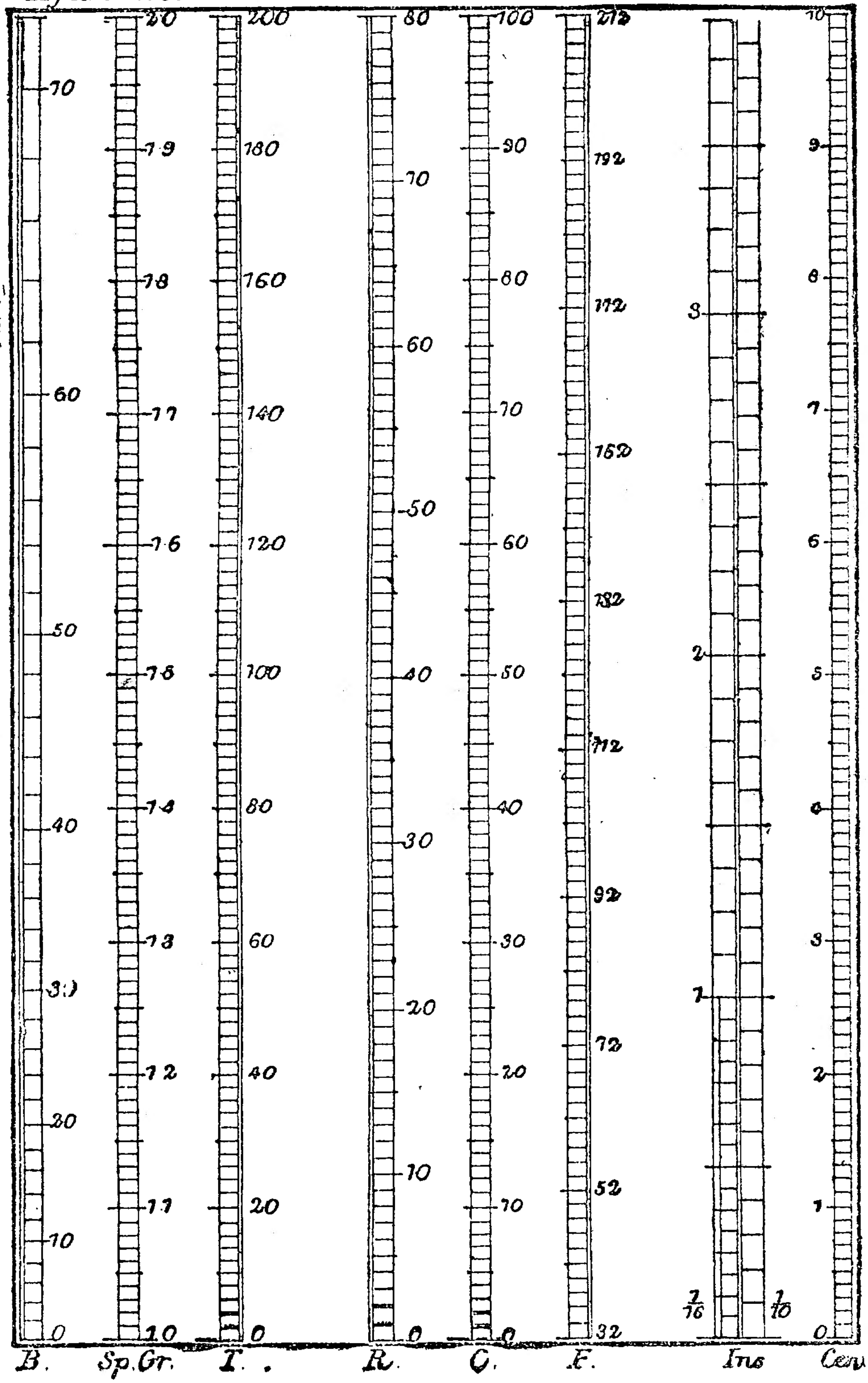
(*For Index, see page* 468.)

The small figures indicate Sp. Gr. the large ones Degrees Twaddle



The arrows point to the figures corresponding to the curves

Comparison of Hydrometers Thermometers Scales



CHEMISTS' POCKET-BOOK

TABLE OF THE SYMBOLS, ATOMIC WEIGHTS, AND ATOMICITIE OF THE ELEMENTS.

Element.	Symbol and Atomicity.	Atomic Weight.	Element.	Symbol and Atomicity.	Atomic Weight.
Aluminium ..	Al^{IV}	27·5	Chromium ..	Cr^{VI}	52·5
Antimony ..	Sb^{V}	122	Cobalt	Co^{VI}	58·8
Arsenic ..	As^{V}	75	Copper	Cu^{II}	63·5
Barium ..	Ba^{II}	137	Didymium ..	D^{II}	96
Bismuth ..	Bi^{V}	208	Fluorine ..	F^{I}	19
Boron	B^{III}	11	Glucinum ..	Be^{II}	9·2
Bromine ..	Br^{I}	80	Gold	Au^{III}	196·7
Cadmium ..	Cd^{II}	112	Hydrogen ..	H^{I}	1
Cæsium ..	Cs^{I}	133	Indium ..	In^{II}	113·4
Calcium ..	Ca^{II}	40	Iodine	I^{III}	127
Carbon	C^{IV}	12	Iridium ..	Ir^{VI}	198
Cerium	Ce^{VI}	92	Iron	Fe^{VI}	56
Chlorine ..	Cl^{I}	35·5	Lanthanum	L^{II}	92

TABLE OF THE SYMBOLS, &c.—*continued.*

Element.	Symbol and Atomicity.	Atomic Weight.	Element.	Symbol and Atomicity.	Atomic Weight.
Lead	Pb^{IV}	207	Selenium ..	Se^{VI}	79
Lithium ..	Li^{I}	7	Silicon	Si^{IV}	28·5
Magnesium ..	Mg^{II}	24	Silver	Ag^{I}	108
Manganese ..	Mn^{VI}	55	Sodium.. ..	Na^{I}	23
Mercury ..	Hg^{II}	200	Strontium ..	Sr^{II}	87·5
Molybdenum	Mo^{VI}	92	Sulphur ..	S^{VI}	32
Nickel	Ni^{VI}	58·8	Tantalum ..	Ta^{IV}	137·5
Niobium ..	Nb^{IV}	97·6	Tellurium ..	Te^{VI}	128
Nitrogen ..	N^{V}	14	Thallium ..	Tl^{III}	204
Osmium ..	Os^{VI}	199	Thorium ..	Th^{IV}	231·5
Oxygen ..	O^{II}	16	Tin	Sn^{IV}	118
Palladium ..	Pd^{IV}	106·5	Titanium ..	Ti^{IV}	50
Phosphorus..	P^{V}	31	Tungsten ..	W^{VI}	184
Platinum ..	Pt^{IV}	197·4	Uranium ..	Ur^{VI}	120
Potassium ..	K^{I}	39	Vanadium ..	V^{V}	51·2
Rhodium ..	Rh^{VI}	104	Yttrium ..	Y^{II}	68
Rubidium ..	Rb^{I}	85·5	Zinc	Zn^{II}	65
Ruthenium ..	Ru^{VI}	104	Zirconium ..	Zr^{IV}	90

TABLE GIVING THE ATOMIC WEIGHT OF THE ELEMENTS, ACCORDING TO THE LATEST DETERMINATIONS.

Name.	Atomic Weight.	Name.	Atomic Weight.
Aluminium ..	27·3	Molybdenum ..	95·6
Antimony	122·0	Nickel..	58·6
Arsenic	74·9	Niobium	94·0
Barium	136·8	Nitrogen	14·01
Beryllium	9·0	Osmium	198·6
Bismuth	210·0	Oxygen	15·96
Boron	11·0	Palladium	106·2
Bromine	79·75	Phosphorus ..	30·96
Cadmium	111·6	Platinum	196·7
Cæsium	133·0	Potassium	39·04
Calcium	39·9	Rhodium	104·1
Carbon..	11·97	Rubidium	85·2
Chlorine	35·37	Ruthenium ..	103·5
Cerium	141·2	Selenium	78·0
Chromium	52·4	Silicon	28·0
Cobalt	58·6	Silver	107·66
Copper..	63·0	Sodium	22·96
Didymium	147·0	Strontium ..	87·2
Erbium	169·0	Sulphur	31·98
Fluorine	19·1	Tantalum	182·0
Gold	196·2	Tellurium	128·0
Hydrogen	1	Thallium	203·6
Indium	113·4	Thorium	231·5
Iodine..	126·53	Tin	117·8
Iridium	196·7	Titanium	48
Iron	55·9	Tungsten	184·0
Lanthanum ..	139·0	Uranium	240·0
Lead	206·4	Vanadium	51·2
Lithium	7·01	Yttrium	93·0
Magnesium ..	23·94	Zinc	64·9
Manganese.. ..	54·8	Zirconium	90·0
Mercury	199·8		

TABLE SHOWING THE GROUPING OF THE ELEMENTS.

Oxygen.	Chlorine.	Nitrogen.	Chromium.
Sulphur.	Bromine.	Phosphorus.	Vanadium.
Selenium.	Iodine.	Arsenic.	Molybdenum.
Tellurium.	Fluorine.	Antimony.	Tungsten.
Silicon.	Barium.	Cerium.	Iron.
Titanium.	Strontium.	Lanthanum.	Cobalt.
Tantalum.	Calcium.	Didymium.	Nickel.
Niobium.	Magnesium.		Manganese.

Cadmium.	Potassium.	Platinum.
Zinc.	Sodium.	Palladium.
	Lithium.	Rhodium.
	Cæsium.	Iridium.
	Rubidium.	Ruthenium.
		Osmium.

Atom, Volume, and Molecular Weight of the Elements known in the State of Vapour.

(After A. W. Hofmann.)

Name.	Symbol of Atom.	Symbol of Molecule.	Volume Weight.	Molecular Weight.
Hydrogen	H	H_2	1	2
Arsenic	As	As_4	150	300
Bromine	Br	Br_2	80	160
Cadmium	Cd	Cd	56	112
Chlorine	Cl	Cl_2	35·5	71
Iodine	I	I_2	127	254
Mercury	Hg	Hg	100	200
Nitrogen	N	N_2	14	28
Oxygen	O	O_2	16	32
Phosphorus	P	P_4	62	124
Selenium	Se	Se_2	79	158
Sulphur	S	S_2	32	64

Table for the Estimation of various Substances by weighing the CO_2 evolved.

Substance.	Sought.	Factor.	Logarithm.
Sodium carbonate (crystallized).	$Na_2CO_3 + 10H_2O$	6·5000	0, 81291
Potassium carbonate	K_2CO_3	3·1409	0, 49705
Manganese peroxide	MnO_2	·9886	$\bar{1}$, 99502
Acetic acid..	$C_2H_4O_2$	1·364	0, 13481
Nitric anhydride ..	N_2O_5	1·228	0, 08920
Hydrochloric acid ..	HCl	·830	$\bar{1}$, 91908
Sulphuric anhydride	SO_3	1·1137	0, 05576

Factors for use in Biological Analyses.

Found.	Formula.	Sought.	Coefficient.
Platinum	Pt	Urea	·3030
Ammonium chloroplatinate.	$2NH_4Cl, PtCl_4$	Urea	·1365
Barium carbonate	$BaCO_3$	Urea	·4041
Double chloride of zinc and creatinine.	$(C_4H_7N_3O)_2, ZnCl_2$	Creatinine	·6244
Iron	Fe	Hæmoglobine	238·1

Table for Estimation of Urea by Yvon's process.

C. c. of N. at 0° C. and 760 mm. derived from 1 c. c. of Urine.	Grams of Urea per Litre of Urine.	C. c. of N. at 0° C. and 760 mm. derived from 1 c. c. of Urine.	Grams of Urea per Litre of Urine.
1	2·7	6	16·2
2	5·4	7	18·9
3	8·2	8	21·6
4	10·8	9	24·3
5	13·5	10	27·0

Transformation of Columns of Water into Columns of Mercury.

Millim. of Water.	Millim. of Mercury.	Millim. of Water.	Millim. of Mercury.	Millim. of Water.	Millim. of Mercury.	Millim. of Water.	Millim. of Mercury.
1	·074	8	·59	35	2·58	65	4·80
2	·15	9	·66	40	2·95	70	5·17
3	·22	10	·74	45	3·32	75	5·54
4	·30	15	1·12	50	3·69	80	5·90
5	·37	20	1·48	55	4·06	85	6·27
6	·44	25	1·84	60	4·43	90	6·64
7	·52	30	2·21				

Various Useful Data.

To reduce specific gravity with regard to air to specific gravity with regard to hydrogen, multiply by 14·438.

To reduce specific gravity with regard to hydrogen to specific gravity compared to air, multiply by ·06926.

To reduce weight in air to weight in vacuo:

P = weight required in vacuo.
q = weight in air.
V = volume of body weighed.
v = volume of the weights.
s = specific gravity of air (weight of one cubic unit).

$$P = q \times s\,(V - v)$$

To find the area of a circle:

a = area. r = radius.
$\pi = 3{\cdot}1415926$. $a = \pi r^2$.

To find the contents of a sphere $= c$:

$$c = 4{\cdot}1888\, r^3.$$

To find the contents of a cylinder $= c$:

$$c = \text{area of base} \times \text{height}.$$

To find the contents of a rectangular vessel $= c$:

a = length of one side. h = height.
b = length of other side. $c = a \times b \times h$.

To convert the degrees of Twaddle's hydrometer into specific gravity, multiply by 5, and add 1000; this gives the specific gravity with reference to water as 1000.

USEFUL DATA—*continued.*

To convert lbs. per square inch into kilograms per square centimetre, multiply by ·0703.

To convert kilograms per square centimetre into lbs. per square inch, multiply by 14·2247.

To reduce inches to metres, multiply by ·02540.

To reduce inches to centimetres, multiply by 2·540.

To reduce centimetres to inches, multiply by ·3937.

To reduce kilograms to pounds, multiply by 2·2046.

To reduce litres to gallons, multiply by ·22.

To reduce gallons to litres, multiply by 4·548.

To reduce pints to cubic centimetres, multiply by 567·936.

To reduce grams to grains, multiply by 15·432.

To reduce grains to grams, multiply by ·0648.

To reduce ounces to grams, multiply by 28·349.

The following data are useful in calculations relating to air:—

To find the quantity of nitrogen by volume corresponding to 1 volume of oxygen, multiply by 3·770992.

To find the quantity of oxygen by volume corresponding to 1 volume of nitrogen, multiply by ·265182.

To find the quantity of nitrogen by weight corresponding to 1 part by weight of oxygen, multiply by 3·313022.

To find the quantity of oxygen by weight corresponding to 1 part by weight of nitrogen, multiply by ·301839.

To find the quantity of nitrogen by volume corresponding to 1 part by weight of oxygen, multiply by 2·6365411.

USEFUL DATA—*continued.*

To find the quantity of oxygen by volume corresponding to 1 part by weight of nitrogen, multiply by ·2730071.

To find the quantity of nitrogen by weight corresponding to 1 part by volume of oxygen, multiply by 3·6629154.

To find the quantity of oxygen by weight corresponding to 1 part by volume of nitrogen, multiply by ·3792848.

FACTORS USED IN ORGANIC ANALYSIS.

Weight of H_2O divided by 9 or multiplied by ·1111 = Hydrogen.

Weight of CO_2 multiplied by $\frac{3}{11}$ = Carbon.

FORMULA FOR THE ESTIMATION OF NITROGEN BY VOLUME.

w = weight of Nitrogen.

v = volume of Nitrogen.

p = pressure corrected for tension of aqueous vapour.

t = temperature in degrees C.

$$w = \frac{\cdot 0012562 \times v \times p}{(1 + \cdot 00367\, t)\, 760}.$$

For value of log. $\frac{\cdot 0012562}{(1 + \cdot 00367\, t)\, 760}$, see Table.

TABLE OF COEFFICIENTS GIVING THE AMOUNT OF THE CONSTITUENT SOUGHT BY SIMPLE MULTIPLICATION.

Element.	Found.	Form.	Sought.	Form.	Coeffic.
Aluminium	Alumina	Al_2O_3	Aluminium	Al_2	·53398
Ammonium	Ammonic chloride.	NH_4Cl	Ammonia	NH_3	·31804
	Ammonio platinic chloride.	$2NH_4Cl, PtCl_4$	Ammonia	$2NH_3$	·07614
Antimony	Antimonious oxide.	Sb_2O_3	Antimony	Sb_2	·83562
	Antimonious sulphide.	Sb_2S_3	Antimony	Sb_2	·71765
	Antimonious sulphide.	Sb_2S_3	Antimonious oxide.	Sb_2O_3	·85882
	Diantimonic tetroxide.	Sb_2O_4	Antimonious oxide.	Sb_2O_3	·94805
Arsenic ..	Arsenious anhydride.	As_2O_3	Arsenic	As_2	·75758
	Arsenic anhydride.	As_2O_5	Arsenic	As_2	·65217
	Arsenic anhydride.	As_2O_5	Arsenious anhydride.	As_2O_3	·86087
	Arsenious sulphide.	As_2S_3	Arsenious anhydride.	As_2O_3	·80488
	Arsenious sulphide.	As_2S_3	Arsenic anhydride.	As_2O_5	·93496
	Ammonic magnesic arseniate.	$(MgNH_4AsO_4)_2, OH_2$.	Arsenic anhydride.	As_2O_5	·60526
	Ammonic magnesic arseniate.	$(MgNH_4AsO_4)_2, OH_2$.	Arsenious anhydride.	As_2O_3	·52105

TABLE OF COEFFICIENTS, &c.—*continued.*

Element.	Found.	Form.	Sought.	Form.	Coeffic.
Barium ..	Baryta	BaO	Barium	Ba	·89542
	Baric sulphate	$BaSO_4$	Baryta	BaO	·65665
	Baric carbonate	$BaCO_3$	Baryta	BaO	·77665
	Baric silico-fluoride.	BaF_2, SiF_4	Baryta	BaO	·54839
Bismuth..	Bismuthous oxide.	Bi_2O_3	Bismuth	Bi_2	·89655
Boron ..	Boracic anhydride.	B_2O_3	Boron	B_2	·31429
Bromine..	Argentic bromide.	$AgBr$	Bromine	Br	·42560
Cadmium	Cadmic oxide	CdO	Cadmium	Cd	·87500
Calcium ..	Lime (calcic oxide).	CaO	Calcium	Ca	·71429
	Calcic sulphate	$CaSO_4$	Lime	CaO	·41176
	Calcic carbonate	$CaCO_3$	Lime	CaO	·56000
Carbon ..	Carbonic anhydride.	CO_2	Carbon	C	·27273
	Calcic carbonate.	$CaCO_3$	Carbonic anhydride.	CO_2	·44000
Chlorine..	Argentic chloride.	$AgCl$	Chlorine	Cl	·24724
	Argentic chloride.	$AgCl$	Hydro-chloric acid.	HCl	·25421
Chromium	Chromic oxide	Cr_2O_3	Chromium	Cr_2	·68619
	Chromic oxide	Cr_2O_3	Chromic anhydride.	$2CrO_3$	1·31381
	Plumbic chromate.	$PbCrO_4$	Chromic anhydride.	CrO_3	·31062
Cobalt ..	Cobalt	Co	Cobaltous oxide.	CoO	1·27119
	Cobaltic intermediate oxide.	$Co_{12}O_{19}$	Cobalt	Co_{12}	·69991

TABLE OF COEFFICIENTS, &c.—*continued.*

Element.	Found.	Form.	Sought.	Form.	Coeffic.
Cobalt (*continued*).	Tricobaltic pentoxide.	Co_3O_5	Cobalt	Co_3	·68871
	Cobaltous sulphate.	$CoSO_4$	Cobaltous oxide.	CoO	·48387
	Tricobaltic tetroxide.	Co_3O_4	Cobalt	Co_3	·73444
	Cobaltic potassic nitrite.	Co_2O_3, $3K_2O$ $5N_2O_3$, $2OH_2$.	Cobaltous oxide.	$2CoO$	·17348
	Cobaltous potassic sulphate.	$2CoSO_4 + 3K_2SO_4$.	Cobaltous oxide.	$2CoO$	·18015
	Cobaltous potassic sulphate.	$2CoSO_4 + 3K_2SO_4$.	Cobalt	Co_2	·14171
Copper ..	Cupric oxide	CuO	Copper	Cu	·79849
	Cuprous sulphide.	Cu_2S	Copper	Cu_2	·79849
Fluorine..	Calcic fluoride	CaF_2	Fluorine	F_2	·48718
	Silicic fluoride	SiF_4	Fluorine	F_4	·73077
Hydrogen	Water	H_2O	Hydrogen	H_2	·11111
Iodine ..	Argentic iodide	AgI	Iodine	I	·54049
	Palladious iodide.	PdI_2	Iodine	I_2	·70556
Iron ..	Ferric oxide	Fe_2O_3	Iron	Fe_2	·70000
	Ferric oxide	Fe_2O_3	Ferrous oxide.	$2FeO$	·90000
	Ferrous sulphide.	FeS	Iron	Fe	·63636
Lead ..	Plumbic oxide	PbO	Lead	Pb	·92825
	Plumbic sulphate.	$PbSO_4$	Plumbic oxide.	PbO	·73597
	Plumbic sulphate.	$PbSO_4$	Lead	Pb	·68317
	Plumbic chloride.	$PbCl_2$	Lead	Pb	·74482

TABLE OF COEFFICIENTS, &c.—*continued.*

Element.	Found.	Form.	Sought.	Form.	Coeffic.
Lead (*continued*).	Plumbic chloride.	$PbCl_2$	Plumbic oxide.	PbO	·80239
	Plumbic sulphide.	PbS	Plumbic oxide.	PbO	·93305
Lithium ..	Lithiccarbonate	Li_2CO_3	Lithic oxide	Li_2O	·40541
	Lithic sulphate	Li_2SO_4	Lithic oxide	Li_2O	·27273
	Lithic phosphate.	Li_3PO_4	Lithic oxide	Li_2O	·38793
Magnesium	Magnesic oxide	MgO	Magnesium	Mg	·60000
	Magnesic sulphate.	$MgSO_4$	Magnesic oxide.	MgO	·33350
	Magnesic pyrophosphate.	$Mg_2P_2O_7$	Magnesic oxide.	$2MgO$	·36036
Manganese	Manganous oxide.	MnO	Manganese	Mn	·77465
	Trimanganic tetroxide.	Mn_3O_4	Manganese	Mn_3	·72052
	Manganic oxide	Mn_2O_3	Manganese	Mn_2	·69620
	Manganous sulphate.	$MnSO_4$	Manganous oxide.	MnO	·47020
	Manganous sulphide.	MnS	Manganous oxide.	MnO	·81609
	Manganous sulphide.	MnS	Manganese	Mn	·63218
Mercury..	Mercury	$2Hg$	Mercurous oxide.	Hg_2O	1·04000
	Mercury	Hg	Mercuric oxide.	HgO	1·08000
	Mercurous chloride.	Hg_2Cl_2	Mercury	$2Hg$	·84940
	Mercuric sulphide.	HgS	Mercury	Hg	·86207
Nickel ..	Nickelous oxide	NiO	Nickel	Ni	·78667
Nitrogen..	Ammonic platinic chloride.	$2NH_4Cl, PtCl_4$.	Nitrogen	N_2	·06271

TABLE OF COEFFICIENTS, &c.—*continued.*

Element.	Found.	Form.	Sought.	Form.	Coeffic.
Nitrogen (*continued*).	Platinum	Pt	Nitrogen	N_2	·14155
	Baric sulphate	$BaSO_4$	Nitric anhydride.	N_2O_5	·46352
	Argentic cyanide.	AgCN	Cyanogen	CN	·19410
	Argentic cyanide.	AgCN	Hydrocyanic acid.	HCN	·20156
Oxygen ..	Alumina	Al_2O_3	Oxygen	O_3	·46602
	Antimonious oxide.	Sb_2O_3	Oxygen	O_3	·16438
	Arsenious anhydride.	As_2O_3	Oxygen	O_3	·24242
	Arsenic anhydride.	As_2O_5	Oxygen	O_5	·34783
	Baric oxide	BaO	Oxygen	O	·10458
	Bismuthous oxide.	Bi_2O_3	Oxygen	O_3	·10345
	Cadmic oxide	CdO	Oxygen	O	·12500
	Chromic oxide	Cr_2O_3	Oxygen	O_3	·31381
	Cobaltous oxide	CoO	Oxygen	O	·21333
	Cupric oxide	CuO	Oxygen	O	·20151
	Ferrous oxide	FeO	Oxygen	O	·22222
	Ferric oxide	Fe_2O_3	Oxygen	O_3	·30000
	Plumbic oxide	PbO	Oxygen	O	·07175
	Calcic oxide	CaO	Oxygen	O	·28571
	Magnesic oxide	MgO	Oxygen	O	·39970
	Manganous oxide.	MnO	Oxygen	O	·22535
	Trimanganic tetroxide.	Mn_3O_4	Oxygen	O_4	·27947
	Manganic oxide	Mn_2O_3	Oxygen	O_3	·30380
	Mercurous oxide.	Hg_2O	Oxygen	O	·03846
	Mercuric oxide	HgO	Oxygen	O	·07407
	Nickelous oxide	NiO	Oxygen	O	·21333
	Potassic oxide	K_2O	Oxygen	O	·16982

TABLE OF COEFFICIENTS, &c.—*continued.*

Element.	Found.	Form.	Sought.	Form.	Coeffic.
Oxygen (*continued*).	Silicic anhydride.	SiO_2	Oxygen	O_2	·53333
	Argentic oxide	Ag_2O	Oxygen	O	·06898
	Sodic oxide	Na_2O	Oxygen	O	·25810
	Strontic oxide	SrO	Oxygen	O	·15459
	Stannic oxide	SnO_2	Oxygen	O_2	·21333
	Water	H_2O	Oxygen	O	·88889
	Zincic oxide	ZnO	Oxygen	O	·19740
Phosphorus	Phosphoric anhydride.	P_2O_5	Phosphorus	P_2	·43662
	Magnesic pyrophosphate.	$Mg_2P_2O_7$	Phosphoric anhydride.	P_2O_5	·63964
	Magnesic pyrophosphate.	MgP_2O_7	..	$2PO_4$	·85585
	Ferric phosphate.	$Fe_2P_2O_8$	Phosphoric anhydride.	P_2O_5	·47020
	Phosphoric anhydride.	P_2O_5	..	$2PO_4$	1·33802
	Argentic phosphate.	Ag_3PO_4	Phosphoric anhydride.	$(P_2O_5)_{\frac{1}{2}}$	·16949
	Uranylic pyrophosphate.	$U_4P_2O_{11}$	Phosphoric anhydride.	P_2O_5	·19910
	Argentic pyrophosphate.	$Ag_4P_2O_7$	Phosphoric anhydride.	P_2O_5	·23437
Potassium	Potassic oxide	K_2O	Potassium	K_2	·83018
	Potassic sulphate.	K_2SO_4	Potassic oxide.	K_2O	·54080
	Potassic nitrate	KNO_3	Potassic oxide.	$(K_2O)_{\frac{1}{2}}$	·46590
	Potassic chloride.	KCl	Potassium	K	·52445
	Potassic chloride.	KCl	Potassic oxide.	$(K_2O)_{\frac{1}{2}}$	·63173
	Potassic platinic chloride.	2KCl, $PtCl_4$.	Potassic oxide.	K_2O	·19272
	Potassic platinic chloride.	2KCl, $PtCl_4$.	Potassic chloride.	2KCl	·30507

TABLE OF COEFFICIENTS, &c.—*continued.*

Element.	Found.	Form.	Sought.	Form.	Coeffic.
Silicon ..	Silicic anhydride.	SiO_2	Silicon	Si	·46667
Silver ..	Argentic chloride.	AgCl	Silver	Ag	·75276
	Argentic chloride.	AgCl	Argentic oxide.	$(Ag_2O)_{\frac{1}{2}}$	·80854
Sodium ..	Sodic oxide	Na_2O	Sodium	Na_2	·74190
	Sodic sulphate	Na_2SO_4	Sodic oxide	Na_2O	·43658
	Sodic nitrate	$NaNO_3$	Sodic oxide	$(Na_2O)_{\frac{1}{2}}$	·36465
	Sodic chloride	NaCl	Sodic oxide	$(Na_2O)_{\frac{1}{2}}$	·53022
	Sodic chloride	NaCl	Sodium	Na	·39337
	Sodic carbonate	Na_2Co_3	Sodic oxide	Na_2O	·58487
Strontium	Strontic oxide	SrO	Strontium	Sr	·84541
	Strontic sulphate.	$SrSO_4$	Strontic oxide.	SrO	·56403
	Strontic carbonate.	$SrCO_3$	Strontic oxide.	SrO	·70169
Sulphur ..	Baric sulphate	$BaSO_4$	Sulphur	S	·13734
	Arsenious sulphide.	As_2S_3	Sulphur	S_3	·39024
	Baric sulphate	$BaSO_4$	Sulphuric anhydride.	SO_3	·34335
	Sulphuric anhydride.	SO_3	..	SO_4	1·20000
Tin	Stannic oxide	SnO_2	Tin	Sn	·78667
	Stannic oxide	SnO_2	Stannous oxide.	SnO	·89333
Zinc ..	Zincic oxide	ZnO	Zinc	Zn	·80260
	Zincic sulphide	ZnS	Zincic oxide	ZnO	·83515
	Zincic sulphide	ZnS	Zinc	Zn	·67031

Stochiometry, or Chemical Calculations.

Conversion of Thermometer Degrees.

°C to °R, multiply by 4 and divide by 5.
°C to °F, multiply by 9, divide by 5, then add 32.
°R to °C, multiply by 5 and divide by 4.
°R to °F, multiply by 9, divide by 4, then add 32.
°F to °R, first subtract 32, then multiply by 4, and divide by 9.
°F to °C, first subtract 32, then multiply by 5, and divide by 9.

To find the Percentage Composition having the Formula given.

Find the molecular weight from the formula then

$$\frac{\text{Molecular weight}}{100} = \frac{\text{Weight of constituent in a molecule.}}{\text{Percentage of constituent.}}$$

Or we may proceed thus:

Multiply the atomic weight of the element by 1, 2, 3, &c., according to the number of atoms of the element there are in the molecule; multiply the number thus obtained by 100, and divide by the molecular weight.

To find the Weight of any Element contained in any given Weight of a Compound Substance.

$$\frac{\text{Molecular weight}}{\text{Given weight}} = \frac{\text{Weight of constituent in a molecule.}}{\text{Required weight.}}$$

Or, Multiply the atomic weight of the element by 1, 2, 3, &c., according to the number of atoms of the element there are in the molecule; multiply the number thus obtained by the given weight, and divide by the molecular weight.

To find the Empirical Formula of a Body from its Percentage Composition.

Divide the percentage of each element by the atomic weight of that element to three places of decimals, and divide all the numbers thus obtained by the lowest; if the quotients are not whole numbers reduce them to their simplest relation in whole numbers, and to these whole numbers prefix the symbol to which each refers.

To find the Weight of a Substance required to yield, liberate, or produce, a given Weight of a Substance.

Write the equation expressing the chemical change; then

Molecular weight of resulting substance × Number of molecules involved	:	Quantity of resulting substance given.	::	Molecular weight of original substance × Number of molecules involved	:	Weight of original substance required.

To solve Problems involving Volumes of Gases.

Write the equation expressing the chemical change, and underneath the gaseous product write the sign $\square\!\square$ for each molecule (if there are more than one), thus:

$$\begin{array}{ccccccccc} MnO_2 & + & 4HCl & = & MnCl_2 & + & Cl_2 & + & 2OH_2 \\ & & \square\!\square & & & & & & \square\!\square \\ 87 & & \square\!\square & & 126 & & \square\!\square & & \square\!\square \\ & & \square\!\square & & & & & & \\ & & \square\!\square & & & & & & \end{array}$$

4 volumes of hydrochloric acid gas yield 1 volume of chlorine and 2 volumes of water vapour. Any problem is readily solved by this method with the aid of simple proportion. The following data must be borne in mind.

An atomic weight of an element taken in grams occupies 11·2 litres, at 0° C. and 760 mm. pressure, but As and P occupy 5·6 litres, and Hg occupies 22·4 litres.

A molecular weight of a compound taken in grams occupies 22·4 litres, unless the vapour density of the compound is abnormal.

1 litre of hydrogen weighs 1 crith = ·0896 gram.

Formula for Correcting the Volume of Gases for Temperature and Pressure.

V = original volume.
V′ = corrected volume.
t = original temperature C°.
t' = final temperature C°.
P = original pressure.
P′ = final pressure.

$$\frac{V}{V'} = \frac{(273 + t)}{(273 + t')} \frac{P'}{P}.$$

Formula for Reducing Gaseous Volumes in the Analysis of Gases.

V′ = correct volume.
V = volume found in the table, and corresponding to the observed height of the mercury in the eudiometer, the meniscus error being included.
B = height of barometer.
B′ = difference of level between the two surfaces of mercury.
t = temperature in °C.
V = tension of aqueous vapour in mm. of mercury.

Then $V' = \frac{V \times (B - B' - V)}{760 \times (1 + \cdot 003665\, t)}$, where 760 mm. is taken as the normal pressure; if 1000 mm. is taken, substitute 1000 for the 760 in the above formula.

RULES FOR INDIRECT ANALYSIS.

Indirect determination of K and Na as sulphates:—

Multiply the sulphuric anhydride (SO_3) found by 2·17775, deduct from the product the sum of the sulphates, and multiply the remainder by 4·4072; the product expresses the quantity of the sodium sulphate.

Indirect determination of K and Na as chlorides:—

Multiply the quantity of chlorine in the mixture by 2·1029, deduct from the product the sum of the chlorides, and multiply the remainder by 3·6288; the product expresses the quantity of sodium chloride present in the mixture.

Indirect determination of Sr and Ca as carbonates:—

Multiply the carbonic anhydride (CO_2) found by 3·3523, deduct from the product the sum of the carbonates, and multiply the difference by 2·10526; the product gives the weight of the calcium carbonate.

Indirect determination of Cl and Br, as AgBr + AgCl, and then as AgCl:—

Multiply the decrease of weight by 4·22025 to find the amount of silver bromide present in the mixture.

Indirect determination of Ba and Ca as sulphates:—

Let w = substance taken;
$x = BaSO_4$ present in the substance;
$y = CaSO_4$ " " " ;

then

$$x + y = w. \qquad [1]$$

When the whole of SO_3 is converted into $BaSO_4$, x will remain unaltered, but y will be increased in the proportion $\frac{233}{136}$; therefore

$$x + \frac{233}{136} y = w', \qquad [2]$$

where w' is the weight of the resulting $BaSO_4$.

Now, subtracting equation [1] from [2], we get $\frac{233}{136} y - y = w' - w$; that is,

$$y \left(\frac{233}{136} - 1 \right) = w' - w,$$

hence

$$y = \frac{w' - w}{\frac{233}{136} - 1},$$

from which the percentage of y can be found.

When the mixture consists of K_2SO_4 and Na_2SO_4, $x = Na_2SO_4$, $y = K_2SO_4$; therefore

$$x + y = w, \qquad [1]$$

and

$$\frac{233}{142} x + \frac{233}{174} y = w'. \qquad [2]$$

Multiplying [1] by $\frac{233}{142}$, we get

$$\frac{233}{143} x + \frac{233}{142} y = \frac{233}{142} w. \qquad [3]$$

Now, subtracting [3] from [2],

$$\frac{233}{174}y - \frac{233}{142}y = w' - \frac{233}{142}w,$$

and

$$y = \frac{w' - \frac{233}{142}w}{\frac{233}{174} - \frac{233}{142}} = w' - \frac{233}{142}w;$$

therefore

$$y = \frac{w' - \frac{233}{142}w}{\frac{233}{174} - \frac{233}{142}}.$$

Generally, when a = coefficient of x, b = coefficient of y.

$$ax + by = w' \text{ [2]};$$
$$ax + ay = aw \text{ [3]}.$$

Subtracting [3] from [2],

$$by - ay = w' - aw, \quad \text{and} \quad y = \frac{w' - aw}{b - a}.$$

The principle is applicable to any mixture of two substances containing one radical, either positive or negative, common to both, and capable of easy estimation.

Weights and Measures of the Metrical System.

Weights.

1 milligram	=	·001 gram.
1 centigram	=	·01 gram.
1 decigram	=	·1 gram.
1 gram	=	weight of a cubic centimetre of water at 4° C.
1 decagram	=	10·000 grams.
1 hectogram	=	100·000 grams.
1 kilogram	=	1000·000 grams.

Measures of Capacity.

1 millilitre	=	1 cubic centimetre, or the measure of 1 gram of water.
1 centilitre	=	10 cubic cent.
1 decilitre	=	100 cubic cent.
1 litre	=	1000 cubic cent.

Measures of Length.

1 millimetre	=	·001 metre.
1 centimetre	=	·01 metre.
1 decimetre	=	·1 metre.
1 metre	=	the ten millionth part of a quarter of the earth's meridian.

Metrical Measures of Length.

	In English Inches.	In English Feet.	In English Yard.	In English Fathoms.	In English Miles.
Millimetre ..	·03937	·003281	·0010936	·0005468	·0000006
Centimetre ..	·39371	·032809	·0109363	·0054682	·0000062
Decimetre ..	3·93708	·328090	·1093633	·0546816	·0000621
Metre	39·37079	3·280899	1·0936331	·5468165	·0006214
Decametre ..	393·70790	32·808992	10·9363306	5·4681653	·0062138
Hectometre ..	3937·07900	328·089917	109·3633056	54·6816528	·0621382
Kilometre ..	39370·7900	3280·899167	1093·6330556	546·8165278	·6213824
Myriametre ..	393707·9000	32808·991667	10936·3305556	5468·1652778	6·2138242

1 inch = 2·539954 centimetres.
1 foot = 3·0479449 decimetres.
1 yard = 0·9143835 metre.
1 mile = 1·6093149 kilometre.

Metrical Measures of Surface.

	In English Square Feet.	In English Square Yards.	In English Poles.	In English Roods.	In English Acres.
Centiare, or square metre ..	10·764299	1·196033	·0395383	·0009885	·0002471
Are, or 100 square metres ..	1076·429934	119·603326	3·9538290	·0988457	·0247114
Hectare, or 10,000 square metres	107642·993419	11960·332602	395·3828959	9·8845724	2·4711431

1 square inch = 6·4513669 square centimetres.
1 square foot = 9·2899683 square decimetres.
1 square yard = ·83609715 square metre.
1 acre = ·40467102 hectare.
1 square mile = 2·58989451.

METRICAL MEASURES OF CAPACITY.

	In Cubic Inches.	In Cubic Feet.	In Pints.	In Gallons.	In Bushels.
Millilitre or cub. cent. ..	·06103	·000035	·00176	·0002201	·0000275
Litre or cub. decim. ..	61·02705	·035317	1·76077	·2200967	·0275121

1 cub. inch = 16·386176 cub. cent. 1 cub. foot = 28·315312 cubic decim.
1 gallon = 4·543458 litres.

METRICAL MEASURES OF WEIGHT.

	In English Grains.	In Troy Ounces.	In Avoirdu-pois Pounds.	In Cwts.	In Tons.
Milligram ..	·01543	·000032	·0000022	·0000000	·0000000
Centigram ..	·15432	·000322	·0000220	·0000002	·0000000
Decigram ..	1·54323	·003215	·0002205	·0000020	·0000001
Gram	15·43235	·032151	·0022046	·0000197	·0000010

1 grain = ·064799 gram. 1 troy ounce = 31·103496 grams.
1 lb. avoir. = ·453593 kilogram. 1 cwt. = 50·802377 kilograms.

Weights and Measures of the British Pharmacopœia of 1867.

Weights.

1 grain, gr.			
1 ounce, oz.		=	437·5 grains.
1 pound, lb.	= 16 oz.	=	7000 „

Measures of Capacity.

1 minim,	min.		
1 fluid drachm,	fl. drm.	=	60 minims.
1 fluid ounce,	fl. oz.	=	8 fluid drachms.
1 pint	O	=	20 fluid ounces.
1 gallon	C	=	8 pints.

Measures of Length.

1 line = $\frac{1}{12}$ inch.

1 inch = $\frac{1}{39\cdot1393}$ seconds—pendulum.

12 „ = 1 foot.

36 „ = 3 feet = 1 yard.

(1 cubic inch of distilled water at 62° F. and 30 inch Barom. = 252·458 grains.)

Relations of Measures to Weights.

1 minim is the measure of 0·91 grain of water.

1 fluid drachm is the measure of 54·68 grains of water.

1 fluid ounce is the measure of 1 ounce or 437·5 grains of water.

1 pint is the measure of 1·25 pound or 8750·0 grains of water.

1 gallon is the measure of 10 pounds or 70,000·0 grains of water.

WEIGHTS AND MEASURES.

Avoirdupois Weight.

drachms.	ozs.	lbs.	qrs.	cwts.	ton.	French grammes.
1=	·0625=	·0039=	·000139=	·000035=	·00000174=	1·771846
16=	1=	·0625=	·00223 =	·000558=	·000028 =	28·34954
256=	16=	1 =	·0357 =	·00893 =	·000447 =	453·59
7168=	448=	28 =	1 =	·25 =	·0125 =	12,700
28672=	1792=	112 =	4 =	1 =	·05 =	50,802
573440=	35840=	2240 =	80 =	20 =	1 =	1,016,048

Troy Weight.

grains.	dwts.	ozs.	lb.	French grammes.
1=	·04167=	·00208=	·0001736=	·0648
24=	1 =	·05 =	·004167 =	1·555
480=	20 =	1 =	·0833 =	31·1035
5760=	240 =	12 =	1 =	373·242

175 lbs. troy = 144 lbs. avoirdupois.
lbs. avoirdupois × ·82286 = lbs. troy.
lbs. troy .. × 1·2153 = lbs. avoirdupois.

Long Measure.

ins.	feet.	yards.	fath.	poles.	furl.	mile.	French mètres.
1=	·083 =	·02778=	·0139=	·005 =	·000126=	·0000158=	·0254
12=	1 =	·333 =	·1667=	·0606=	·00151 =	·0001894=	·3048
36=	3 =	1 =	·5 =	·182 =	·00454 =	·000568 =	·9144
72=	6 =	2 =	1 =	·364 =	·0091 =	·001136 =	1·8287
198=	16½=	5½=	2¾=	1 =	·025 =	·003125 =	5·0291
7920=	660 =	220 =	110 =	40 =	1 =	·125 =	201·16
63360=	5280 =	1760 =	880 =	320 =	8 =	1 =	1609·315

WEIGHTS AND MEASURES—*continued.*

WINE MEASURE.

pints												
2	=	1 quart.										
8	=	4	=	1 gallon.								
336	=	168	=	42	=	1 tierce.						
504	=	252	=	63	=	$1\frac{1}{2}$	=	1 hogshead.				
672	=	336	=	84	=	2	=	$1\frac{1}{3}$	=	1 puncheon.		
1008	=	504	=	126	=	3	=	2	=	$1\frac{1}{2}$	=	1 pipe.
2016	=	1008	=	252	=	6	=	4	=	3	=	2 = 1 tun.

ALE AND BEER MEASURE.

pints														
2	=	1 quart.												
8	=	4	=	1 gallon.										
72	=	36	=	9	=	1 firkin.								
144	=	72	=	18	=	2	=	1 kilderkin.						
288	=	144	=	36	=	4	=	2	=	1 barrel.				
432	=	216	=	54	=	6	=	3	=	$1\frac{1}{2}$	=	1 hogshead.		
576	=	288	=	72	=	8	=	4	=	2	=	$1\frac{1}{3}$	=	1 puncheon.
864	=	432	=	108	=	12	=	6	=	3	=	2	=	$1\frac{1}{2}$ = 1 butt.

MEASURE OF CAPACITY.

ints.	gall.	peck.	bushel.	quarter.	wey.	last.	cub. ft.	litres.
1	= ·125	= ·0625	= ·01562	= ·00195	= ·00039	= ·000195	= ·02	= ·5676
8	= 1	= ·5	= ·125	= ·0156	= ·00312	= ·00156	= ·1604	= 4·541
16	= 2	= 1	= ·25	= ·03125	= ·00625	= ·00312	= ·3208	= 9·082
64	= 8	= 4	= 1	= ·125	= ·025	= ·0125	= 1·283	= 36·32816
512	= 64	= 32	= 8	= 1	= ·2	= ·1	= 10·264	= 290·625
560	= 320	= 160	= 40	= 5	= 1	= ·5	= 51·319	= 1453·126
120	= 640	= 320	= 80	= 10	= 2	= 1	= 102·64	= 2906·25

1 gallon in wine, ale, or dry measure
= $277\frac{1}{4}$ cubic inches = ·16 cubic foot
= 10 lbs. of distilled water =
Cube feet × 6·2355 = gallons.
Cube ins. × ·003607 = gallons.
1 bushel = 2218·19 cube inches = 1·28 cube foot.
Cube feet × ·78 = bushels.
Cube ins. × ·00045 = bushels.

TABLE SHOWING A COMPARISON OF THE WEIGHTS AND MEASURES OF THE METRIC SYSTEM WITH THOSE OF VARIOUS COUNTRIES.

Measures of Length.		Measures of Surface.		Measures of Capacity.		Measures of Weight.		Where used.
Name.	Value in Metres.	Name.	Value in Sq. Metres.	Name.	Value.	Name.	Value in Grams.	
Metre	—	Sq. metre	—	Cub. metre	—	Gram	—	France, Germany, Italy, (England), Holland.
—	—	—	—	Litre	—	—	—	
Foot	·30479	Sq. foot	·092894	Cub. foot	·02831 cub. metre	Pound	453·592	England, United States.
—	—	—	—	Gallon	4·543458 litres	—	—	
Foot	·316103	Sq. foot	·0999	Cub. foot	·0309 cub. metre	Pound	560·012	Austria.
Ell	2·465 A. ft.	—	—	—	—	—	—	
Foot	·30479	—	—	Wedro	12·299 litres	Pound	409·52	Russia.
Elle	·71119	—	—	—	—	—	—	
Foot	·30000	Sq. foot	·0900	Malter	150 litres	Pound	500·00	Switzerland.
—	—	—	—	Cub. foot	·0270 cub. metre	—	—	

COMPARISON OF THE GRAM WITH THE MEDICINE-GRAINS OF VARIOUS COUNTRIES.

One gram equals—

15·432 English grains.
16·116 Danish grains.
15·36 Dutch and Belgic grains.
13·71 Austrian grains.
16·103 Russian and Swiss grains.

One gram equals—

20·05 Spanish grains.
16·16 Swedish grains.
20·373 Portuguese grains.
20·815 Italian grains.
16·419 Old Prussian grains.

THE POLAR SYSTEM OF WEIGHTS AND MEASURES.

This system has been devised and introduced by Prof. H. Hennessey, F.R.S.; it is a decimal system, resembling the ordinary metrical system in many respects; but it has this advantage, that it is derived from the length of the earth's axis, which is a fixed quantity, while the French metrical system is derived from the circumference of the earth, which varies with longitude. The Polar inch, also, is a more convenient unit than the centimetre.

1 Polar link = $\frac{1}{500000000}$ of earth's axis .. .. .. } = 10·00967 inches.
1 Polar inch .. .. .. = 1·000967 inch.
1 Polar quart = $\frac{1}{2}$ link cubed = 2·0539 litres.
1 stat = the weight of the water contained by $\frac{1}{20}$ link cubed .. .. .. } = 2·0539 grams.

FOREIGN MONEY, WEIGHTS AND MEASURES, COMPARED WITH ENGLISH.

	Money.		Length.		
	Name of Coin.	Number in £1 English.	Name of Measure.	Number =100 feet English.	Length in inches, English.
England ..	Shilling	20	Foot	100	12
America ..	Dollar	4·84	"	100	12
Austria ..	Florin	9·83	"	96·4	12·45
Denmark ..	Dollar	4·897	"	97·2	12·35
France ..	Franc	25·57	Metre	30·47	39·37
Holland ..	Florin	11·97	Foot	107·7	11·14
Portugal ..	Milreis	4·285	"	92·7	12·96
Prussia ..	Dollar	6·9	"	97·1	12·36
Russia ..	Rouble	6·4	"	87·2	13·75
Spain.. ..	Dollar	4·8	"	108·0	11·03
Sweden ..	Ducat	2·182	"	102·7	11·69

Table for the Conversion of Grams into Grains.

(Contributed by Mr. W. Dawson.)

Grms.	Grains.	Grms.	Grains.	Grms.	Grains.	Grms.	Grains.	Grms.	Grains.
1·000	15·432	·960	14·815	·920	14·197	·880	13·580	·840	12·963
·999	15·416	·959	14·799	·919	14·182	·879	13·565	·839	12·947
·998	15·401	·958	14·784	·918	14·166	·878	13·549	·838	12·932
·997	15·386	·957	14·768	·917	14·151	·877	13·534	·837	12·916
·996	15·370	·956	14·753	·916	14·136	·876	13·518	·836	12·901
·995	15·355	·955	14·737	·915	14·120	·875	13·503	·835	12·886
·994	15·339	·954	14·722	·914	14·105	·874	13·487	·834	12·870
·993	15·324	·953	14·707	·913	14·089	·873	13·472	·833	12·855
·992	15·308	·952	14·691	·912	14·074	·872	13·457	·832	12·839
·991	15·293	·951	14·676	·911	14·058	·871	13·441	·831	12·824
·990	15·278	·950	14·660	·910	14·043	·870	13·426	·830	12·808
·989	15·262	·949	14·645	·909	14·028	·869	13·410	·829	12·793
·988	15·247	·948	14·629	·908	14·012	·868	13·395	·828	12·778
·987	15·231	·947	14·614	·907	13·997	·867	13·379	·827	12·762
·986	15·216	·946	14·599	·906	13·981	·866	13·364	·826	12·747
·985	15·200	·945	14·583	·905	13·966	·865	13·349	·825	12·731
·984	15·185	·944	14·568	·904	13·950	·864	13·333	·824	12·716
·983	15·169	·943	14·552	·903	13·935	·863	13·318	·823	12·700
·982	15·154	·942	14·537	·902	13·920	·862	13·302	·822	12·685
·981	15·138	·941	14·521	·901	13·904	·861	13·287	·821	12·670
·980	15·123	·940	14·506	·900	13·889	·860	13·271	·820	12·654
·979	15·108	·939	14·491	·899	13·873	·859	13·256	·819	12·639
·978	15·092	·938	14·475	·898	13·858	·858	13·241	·818	12·623
·977	15·077	·937	14·460	·897	13·842	·857	13·225	·817	12·608
·976	15·061	·936	14·444	·896	13·827	·856	13·210	·816	12·592
·975	15·046	·935	14·429	·895	13·812	·855	13·194	·815	12·577
·974	15·031	·934	14·413	·894	13·796	·854	13·179	·814	12·562
·973	15·015	·933	14·398	·893	13·781	·853	13·163	·813	12·546
·972	15·000	·932	14·383	·892	13·765	·852	13·148	·812	12·531
·971	14·984	·931	14·367	·891	13·750	·851	13·133	·811	12·515
·970	14·969	·930	14·352	·890	13·734	·850	13·117	·810	12·500
·969	14·954	·929	14·336	·889	13·719	·849	13·102	·809	12·484
·968	14·938	·928	14·321	·888	13·704	·848	13·086	·808	12·469
·967	14·923	·927	14·305	·887	13·688	·847	13·071	·807	12·453
·966	14·907	·926	14·290	·886	13·673	·846	13·055	·806	12·438
·965	14·892	·925	14·275	·885	13·657	·845	13·040	·805	12·423
·964	14·876	·924	14·259	·884	13·642	·844	13·025	·804	12·407
·963	14·861	·923	14·244	·883	13·626	·843	13·009	·803	12·391
·962	14·845	·922	14·228	·882	13·611	·842	12·994	·802	12·376
·961	14·830	·921	14·213	·881	13·595	·841	12·978	·801	12·361

TABLE FOR THE CONVERSION OF GRAMS INTO GRAINS—*continued.*

Grms.	Grains.	Grms.	Grains.	Grms.	Grains.	Grms.	Grains.	Grms.	Grains.
·800	12·346	·760	11·728	·720	11·111	·680	10·494	·640	9·876
·799	12·330	·759	11·712	·719	11·096	·679	10·478	·639	9·861
·798	12·315	·758	11·697	·718	11·080	·678	10·463	·638	9·846
·797	12·299	·757	11·682	·717	11·065	·677	10·447	·637	9·830
·796	12·284	·756	11·666	·716	11·049	·676	10·432	·636	9·815
·795	12·268	·755	11·651	·715	11·034	·675	10·417	·635	9·799
·794	12·253	·754	11·636	·714	11·018	·674	10·401	·634	9·784
·793	12·237	·753	11·620	·713	11·003	·673	10·386	·633	9·768
·792	12·222	·752	11·605	·712	10·987	·672	10·370	·632	9·753
·791	12·207	·751	11·589	·711	10·972	·671	10·355	·631	9·737
·790	12·191	·750	11·574	·710	10·957	·670	10·339	·630	9·722
·789	12·176	·749	11·559	·709	10·941	·669	10·324	·629	9·707
·788	12·160	·748	11·543	·708	10·926	·668	10·308	·628	9·691
·787	12·145	·747	11·528	·707	10·910	·667	10·293	·627	9·676
·786	12·129	·746	11·512	·706	10·895	·666	10·278	·626	9·660
·785	12·114	·745	11·496	·705	10·879	·665	10·262	·625	9·645
·784	12·099	·744	11·481	·704	10·864	·664	10·247	·624	9·629
·783	12·083	·743	11·466	·703	10·849	·663	10·231	·623	9·614
·782	12·068	·742	11·450	·702	10·833	·662	10·216	·622	9·599
·781	12·052	·741	11·435	·701	10·818	·661	10·200	·621	9·583
·780	12·037	·740	11·419	·700	10·802	·660	10·185	·620	9·568
·779	12·021	·739	11·404	·699	10·787	·659	10·170	·619	9·552
·778	12·006	·738	11·389	·698	10·771	·658	10·154	·618	9·537
·777	11·991	·737	11·373	·697	10·756	·657	10·139	·617	9·521
·776	11·975	·736	11·358	·696	10·741	·656	10·123	·616	9·506
·775	11·960	·735	11·342	·695	10·725	·655	10·108	·615	9·490
·774	11·944	·734	11·327	·694	10·710	·654	10·092	·614	9·475
·773	11·929	·733	11·312	·693	10·694	·653	10·078	·613	9·460
·772	11·913	·732	11·296	·692	10·679	·652	10·061	·612	9·444
·771	11·898	·731	11·280	·691	10·663	·651	10·046	·611	9·429
·770	11·883	·730	11·265	·690	10·648	·650	10·030	·610	9·413
·769	11·867	·729	11·250	·689	10·633	·649	10·015	·609	9·398
·768	11·852	·728	11·234	·688	10·617	·648	10·000	·608	9·383
·767	11·836	·727	11·219	·687	10·602	·647	9·984	·607	9·367
·766	11·821	·726	11·203	·686	10·586	·646	9·969	·606	9·352
·765	11·805	·725	11·188	·685	10·571	·645	9·954	·605	9·336
·764	11·790	·724	11·172	·684	10·555	·644	9·938	·604	9·321
·763	11·774	·723	11·157	·683	10·540	·643	9·923	·603	9·305
·762	11·759	·722	11·142	·682	10·525	·642	9·907	·602	9·290
·761	11·744	·721	11·126	·681	10·509	·641	9·892	·601	9·275

TABLE FOR THE CONVERSION OF GRAMS INTO GRAINS—*continued.*

Grms.	Grains.	Grms.	Grains.	Grms.	Grains	Grms.	Grains.	Grms.	Grains.
·600	9·259	·560	8·642	·520	8·025	·480	7·407	·440	6·790
·599	9·244	·559	8·636	·519	8·009	·479	7·392	·439	6·775
·598	9·228	·558	8·621	·518	7·994	·478	7·376	·438	6·759
·597	9·213	·557	8·606	·517	7·978	·477	7·361	·437	6·744
·596	9·197	·556	8·590	·516	7·963	·476	7·346	·436	6·728
·595	9·182	·555	8·574	·515	7·947	·475	7·330	·435	6·713
·594	9·167	·554	8·559	·514	7·932	·474	7·315	·434	6·698
·593	9·151	·553	8·543	·513	7·917	·473	7·300	·433	6·682
·592	9·136	·552	8·518	·512	7·901	·472	7·284	·432	6·667
·591	9·120	·551	8·503	·511	7·886	·471	7·268	·431	6·651
·590	9·105	·550	8·488	·510	7·870	·470	7·253	·430	6·636
·589	9·089	·549	8·472	·509	7·855	·469	7·238	·429	6·620
·588	9·074	·548	8·457	·508	7·839	·468	7·222	·428	6·605
·587	9·058	·547	8·441	·507	7·824	·467	7·207	·427	6·589
·586	9·043	·546	8·426	·506	7·808	·466	7·191	·426	6·574
·585	9·028	·545	8·410	·505	7·793	·465	7·176	·425	6·559
·584	9·012	·544	8·395	·504	7·778	·464	7·160	·424	6·543
·583	8·997	·543	8·379	·503	7·762	·463	7·145	·423	6·528
·582	8·981	·542	8·364	·502	7·746	·462	7·130	·422	6·512
·581	8·965	·541	8·349	·501	7·731	·461	7·114	·421	6·497
·580	8·950	·540	8·333	·500	7·716	·460	7·099	·420	6·481
·579	8·935	·539	8·318	·499	7·700	·459	7·083	·419	6·466
·578	8·920	·538	8·302	·498	7·685	·458	7·068	·418	6·450
·577	8·904	·537	8·287	·497	7·670	·457	7·052	·417	6·435
·576	8·889	·536	8·271	·496	7·654	·456	7·037	·416	6·420
·575	8·873	·535	8·256	·495	7·639	·455	7·021	·415	6·404
·574	8·858	·534	8·241	·494	7·623	·454	7·006	·414	6·389
·573	8·842	·533	8·225	·493	7·608	·453	6·991	·413	6·373
·572	8·827	·532	8·210	·492	7·592	·452	6·975	·412	6·358
·571	8·812	·531	8·194	·491	7·577	·451	6·960	·411	6·342
·570	8·796	·530	8·179	·490	7·561	·450	6·944	·410	6·327
·569	8·781	·529	8·163	·489	7·546	·449	6·929	·409	6·312
·568	8·765	·528	8·148	·488	7·531	·448	6·913	·408	6·296
·567	8·750	·527	8·133	·487	7·515	·447	6·898	·407	6·281
·566	8·734	·526	8·117	·486	7·500	·446	6·883	·406	6·265
·565	8·719	·525	8·102	·485	7·484	·445	6·867	·405	6·250
·564	8·704	·524	8·086	·484	7·469	·444	6·852	·404	6·234
·563	8·688	·523	8·071	·483	7·454	·443	6·836	·403	6·219
·562	8·673	·522	8·055	·482	7·436	·442	6·821	·402	6·204
·561	8·657	·521	8·040	·481	7·423	·441	6·805	·401	6·188

TABLE FOR THE CONVERSION OF GRAMS INTO GRAINS—*continued.*

Grms.	Grains.	Grms.	Grains.	Grms.	Grains.	Grms.	Grains.	Grms.	Grains.
·400	6·173	·360	5·555	·320	4·938	·280	4·321	·240	3·704
·399	6·157	·359	5·540	·319	4·922	·279	4·305	·239	3·688
·398	6·142	·358	5·525	·318	4·907	·278	4·290	·238	3·673
·397	6·126	·357	5·509	·317	4·892	·277	4·275	·237	3·657
·396	6·111	·356	5·494	·316	4·876	·276	4·259	·236	3·642
·395	6·096	·355	5·478	·315	4·861	·275	4·244	·235	3·626
·394	6·080	·354	5·462	·314	4·846	·274	4·228	·234	3·611
·393	6·065	·353	5·447	·313	4·830	·273	4·213	·233	3·596
·392	6·049	·352	5·432	·312	4·815	·272	4·197	·232	3·580
·391	6·034	·351	5·417	·311	4·800	·271	4·182	·231	3·565
·390	6·018	·350	5·401	·310	4·784	·270	4·167	·230	3·549
·389	6·003	·349	5·386	·309	4·768	·269	4·151	·229	3·534
·388	5·987	·348	5·370	·308	4·753	·268	4·136	·228	3·518
·387	5·972	·347	5·355	·307	4·738	·267	4·120	·227	3·503
·386	5·957	·346	5·340	·306	4·722	·266	4·105	·226	3·488
·385	5·941	·345	5·324	·305	4·707	·265	4·089	·225	3·472
·384	5·926	·344	5·309	·304	4·691	·264	4·074	·224	3·457
·383	5·910	·343	5·293	·303	4·676	·263	4·059	·223	3·441
·382	5·895	·342	5·278	·302	4·660	·262	4·043	·222	3·426
·381	5·879	·341	5·262	·301	4·645	·261	4·028	·221	3·410
·380	5·864	·340	5·247	·300	4·630	·260	4·012	·220	3·395
·379	5·849	·339	5·231	·299	4·614	·259	3·997	·219	3·380
·378	5·833	·338	5·216	·298	4·599	·258	3·981	·218	3·364
·377	5·818	·337	5·200	·297	4·583	·257	3·966	·217	3·349
·376	5·802	·336	5·185	·296	4·568	·256	3·950	·216	3·333
·375	5·787	·335	5·170	·295	4·552	·255	3·935	·215	3·318
·374	5·771	·334	5·154	·294	4·537	·254	3·920	·214	3·302
·373	5·756	·333	5·139	·293	4·521	·253	3·904	·213	3·287
·372	5·741	·332	5·123	·292	4·506	·252	3·889	·212	3·271
·371	5·725	·331	5·108	·291	4·491	·251	3·873	·211	3·256
·370	5·710	·330	5·092	·290	4·475	·250	3·858	·210	3·241
·369	5·694	·329	5·077	·289	4·460	·249	3·842	·209	3·225
·368	5·679	·328	5·062	·288	4·444	·248	3·827	·208	3·210
·367	5·663	·327	5·046	·287	4·429	·247	3·812	·207	3·194
·366	5·648	·326	5·031	·286	4·413	·246	3·796	·206	3·179
·365	5·633	·325	5·015	·285	4·398	·245	3·781	·205	3·163
·364	5·617	·324	5·000	·284	4·383	·244	3·765	·204	3·148
·363	5·602	·323	4·984	·283	4·367	·243	3·750	·203	3·133
·362	5·586	·322	4·969	·282	4·352	·242	3·734	·202	3·117
·361	5·571	·321	4·953	·281	4·336	·241	3·719	·201	3·102

TABLE FOR THE CONVERSION OF GRAMS INTO GRAINS—*continued.*

Grms.	Grains.	Grms.	Grains.	Grms.	Grains.	Grms.	Grains.	Grms.	Grains.
·200	3·086	·160	2·470	·120	1·852	·080	1·234	·040	0·617
·199	3·071	·159	2·454	·119	1·836	·079	1·219	·039	0·602
·198	3·055	·158	2·438	·118	1·821	·078	1·204	·038	0·586
·197	3·040	·157	2·423	·117	1·805	·077	1·188	·037	0·571
·196	3·025	·156	2·407	·116	1·790	·076	1·173	·036	0·555
·195	3·009	·155	2·392	·115	1·775	·075	1·157	·035	0·540
·194	2·994	·154	2·376	·114	1·759	·074	1·142	·034	0·525
·193	2·978	·153	2·361	·113	1·744	·073	1·126	·033	0·509
·192	2·963	·152	2·346	·112	1·728	·072	1·111	·032	0·494
·191	2·947	·151	2·330	·111	1·713	·071	1·096	·031	0·478
·190	2·932	·150	2·315	·110	1·697	·070	1·080	·030	0·463
·189	2·917	·149	2·299	·109	1·682	·069	1·065	·029	0·447
·188	2·901	·148	2·284	·108	1·667	·068	1·049	·028	0·432
·187	2·886	·147	2·268	·107	1·651	·067	1·034	·027	0·417
·186	2·870	·146	2·253	·106	1·636	·066	1·018	·026	0·401
·185	2·855	·145	2·238	·105	1·620	·065	1·003	·025	0·386
·184	2·839	·144	2·222	·104	1·605	·064	0·987	·024	0·370
·183	2·824	·143	2·207	·103	1·589	·063	0·972	·023	0·355
·182	2·809	·142	2·191	·102	1·574	·062	0·957	·022	0·339
·181	2·793	·141	2·175	·101	1·559	·061	0·941	·021	0·324
·180	2·778	·140	2·160	·100	1·543	·060	0·926	·020	0·309
·179	2·762	·139	2·145	·099	1·528	·059	0·910	·019	0·293
·178	2·747	·138	2·130	·098	1·512	·058	0·895	·018	0·278
·177	2·731	·137	2·114	·097	1·497	·057	0·880	·017	0·262
·176	2·716	·136	2·099	·096	1·481	·056	0·862	·016	0·247
·175	2·701	·135	2·083	·095	1·466	·055	0·849	·015	0·231
·174	2·685	·134	2·068	·094	1·451	·054	0·833	·014	0·216
·173	2·670	·133	2·052	·093	1·435	·053	0·818	·013	0·200
·172	2·654	·132	2·037	·092	1·420	·052	0·802	·012	0·185
·171	2·639	·131	2·021	·091	1·404	·051	0·787	·011	0·170
·170	2·623	·130	2·006	·090	1·389	·050	0·772	·010	0·154
·169	2·608	·129	1·991	·089	1·373	·049	0·756	·009	0·139
·168	2·592	·128	1·975	·088	1·358	·048	0·741	·008	0·123
·167	2·577	·127	1·960	·087	1·342	·047	0·725	·007	0·108
·166	2·562	·126	1·944	·086	1·327	·046	0·710	·006	0·092
·165	2·546	·125	1·929	·085	1·312	·045	0·694	·005	0·077
·164	2·531	·124	1·913	·084	1·296	·044	0·679	·004	0·062
·163	2·515	·123	1·898	·083	1·281	·043	0·663	·003	0·046
·162	2·500	·122	1·883	·082	1·265	·042	0·648	·002	0·031
·161	2·484	·121	1·867	·081	1·250	·041	0·633	·001	0·015

TABLE FOR THE CONVERSION OF GRAMS INTO GRAINS—*continued.*

Grams.	Grains.	Grams.	Grains.	Grams.	Grains.
2	30·865	45	694·456	140	2160·523
3	46·297	50	771·617	150	2314·852
4	61·729	55	848·779	160	2469·176
5	77·162	60	925·941	170	2623·499
6	92·594	65	1003·103	180	2777·823
7	108·026	70	1080·264	190	2932·146
8	123·459	75	1157·426	200	3086·470
9	138·891	80	1234·588	300	4629·705
10	154·323	85	1311·750	400	6172·940
15	231·485	90	1388·911	500	7716·174
20	308·647	95	1466·073	600	9259·409
25	385·809	100	1543·235	700	10802·644
30	462·970	110	1697·558	800	12345·879
35	540·132	120	1851·882	900	13889·114
40	617·294	130	2006·205	1000	15432·349

TABLE FOR THE CONVERSION OF GRAINS INTO GRAMS.

Grns.	Grams.	Grns.	Grams.	Grns.	Grams.	Grns.	Grams.
1	·0648	6	·3888	11	·7128	16	1·0368
2	·1296	7	·4536	12	·7776	17	1·1016
3	·1944	8	·5184	13	·8424	18	1·1664
4	·2592	9	·5832	14	·9072	19	1·2312
5	·3240	10	·6480	15	·9720	20	1·2960

TABLE FOR THE CONVERSION, &c.—*continued.*

Grains.	Grams.	Grains.	Grams.	Grains.	Grams.
21	1·3608	51	3·3047	81	5·2487
22	1·4256	52	3·3695	82	5·3135
23	1·4904	53	3·4343	83	5·3783
24	1·5552	54	3·4991	84	5·4431
25	1·6200	55	3·5639	85	5·5079
26	1·6848	56	3·6287	86	5·5727
27	1·7496	57	3·6935	87	5·6375
28	1·8144	58	3·7583	88	5·7023
29	1·8792	59	3·8231	89	5·7671
30	1·9440	60	3·8879	90	5·8319
31	2·0088	61	3·9527	91	5·8967
32	2·0736	62	4·0175	92	5·9615
33	2·1384	63	4·0823	93	6·0263
34	2·2032	64	4·1471	94	6·0911
35	2·2680	65	4·2119	95	6·1559
36	2·3328	66	4·2767	96	6·2207
37	2·3976	67	4·3415	97	6·2855
38	2·4624	68	4·4063	98	6·3503
39	2·5272	69	4·4711	99	6·4151
40	2·5920	70	4·5359	100	6·4799
41	2·6568	71	4·6007	101	6·5447
42	2·7216	72	4·6655	102	6·6095
43	2·7863	73	4·7303	103	6·6743
44	2·8511	74	4·7951	104	6·7391
45	2·9159	75	4·8599	105	6·8039
46	2·9807	76	4·9247	106	6·8687
47	3·0455	77	4·9895	107	6·9335
48	3·1103	78	5·0543	108	6·9983
49	3·1751	79	5·1191	109	7·0631
50	3·2399	80	5·1839	110	7·1279

TABLE FOR THE CONVERSION, &c.—*continued.*

Grains.	Grams.	Grains.	Grams.	Grains.	Grams.
111	7·1927	141	9·1366	171	11·0806
112	7·2575	142	9·2104	172	11·1454
113	7·3223	143	9·2662	173	11·2102
114	7·3871	144	9·3310	174	11·2750
115	7·4519	145	9·3958	175	11·3398
116	7·5177	146	9·4606	176	11·4046
117	7·5815	147	9·5254	177	11·4694
118	7·6463	148	9·5902	178	11·5342
119	7·7111	149	9·6550	179	11·5990
120	7·7759	150	9·7198	180	11·6638
121	7·8407	151	9·7846	181	11·7286
122	7·9055	152	9·8494	182	11·7934
123	7·9703	153	9·9142	183	11·8582
124	8·0351	154	9·9790	184	11·9230
125	8·0999	155	10·0438	185	11·9878
126	8·1647	156	10·1086	186	12·0526
127	8·2295	157	10·1734	187	12·1174
128	8·2943	158	10·2382	188	12·1822
129	8·3591	159	10·3030	189	12·2470
130	8·4239	160	10·3678	190	12·3118
131	8·4887	161	10·4326	200	12·9598
132	8·5536	162	10·4974	250	16·1997
133	8·6183	163	10·5622	300	19·4397
134	8·6831	164	10·6270	400	25·9196
135	8·7479	165	10·6918	500	32·3995
136	8·8127	166	10·7566	600	38·8794
137	8·8775	167	10·8214	700	45·3593
138	8·9422	168	10·8862	800	51·8392
139	9·0070	169	10·9510	900	58·3190
140	9·0718	170	11·0158	1000	64·7989

Table showing Equivalent Rates per Lb., Cwt., and Ton.

Per lb.	Per cwt.		Per ton.			Per lb.	Per cwt.		Per ton.		
d.	s.	d.	£	s.	d.	d.	s.	d.	£	s.	d.
¼	2	4	2	6	8	6¼	58	4	58	6	8
½	4	8	4	13	4	6½	60	8	60	13	4
¾	7	0	7	0	0	6¾	63	0	63	0	0
1	9	4	9	6	8	7	65	4	65	6	8
1¼	11	8	11	13	4	7¼	67	8	67	13	4
1½	14	0	14	0	0	7½	70	0	70	0	0
1¾	16	4	16	6	8	7¾	72	4	72	6	8
2	18	8	18	13	4	8	74	8	74	13	4
2¼	21	0	21	0	0	8¼	77	0	77	0	0
2½	23	4	23	6	8	8½	79	4	79	6	8
2¾	25	8	25	13	4	8¾	81	8	81	13	4
3	28	0	28	0	0	9	84	0	84	0	0
3¼	30	4	30	6	8	9¼	86	4	86	6	8
3½	32	8	32	13	4	9½	88	8	88	13	4
3¾	35	0	35	0	0	9¾	91	0	91	0	0
4	37	4	37	6	8	10	93	4	93	6	8
4¼	39	8	39	13	4	10¼	95	8	95	13	4
4½	42	0	42	0	0	10½	98	0	98	0	0
4¾	44	4	44	6	8	10¾	100	4	100	6	8
5	46	8	46	13	4	11	102	8	102	13	4
5¼	49	0	49	0	0	11¼	105	0	105	0	0
5½	51	4	51	6	8	11½	107	4	107	6	8
5¾	53	8	53	13	4	11¾	109	8	109	13	4
6	56	0	56	0	0	12	112	0	112	0	0

Decimal Equivalents of Pence and Shillings.

Pence.	Shillings.	Pence.	Shillings.	Pence.	Shillings.
½ ..	= ·04166	4½ ..	= ·3750	8½ ..	= ·70832
1 ..	= ·08333	5 ..	= ·41666	9 ..	= ·75
1½ ..	= ·125	5½ ..	= ·45833	9½ ..	= ·79166
2 ..	= ·16666	6 ..	= ·5	10 ..	= ·83333
2½ ..	= ·20832	6½ ..	= ·54166	10½ ..	= ·8750
3 ..	= ·25	7 ..	= ·58333	11 ..	= ·91666
3½ ..	= ·29166	7½ ..	= ·6250	11½ ..	= ·95833
4 ..	= ·33333	8 ..	= ·66666	12 ..	= 1·0000

Decimal Equivalents of Lbs., Qrs., and Cwts.

qrs.	lbs.	cwts.	qrs.	lbs.	cwts.	qrs.	lbs.	cwts.	qrs.	lbs.	cwts.
0	0½ =	·0045	1	0 =	·25	2	0 =	·5	3	0 =	·75
0	1	·0089	1	1	·2589	2	1	·5089	3	1	·7589
0	2	·0179	1	2	·2679	2	2	·5179	3	2	·7679
0	3	·0268	1	3	·2768	2	3	·5268	3	3	·7768
0	4	·0357	1	4	·2857	2	4	·5357	3	4	·7857
0	5	·0446	1	5	·2946	2	5	·5446	3	5	·7946
0	6	·0536	1	6	·3036	2	6	·5536	3	6	·8036
0	7	·0625	1	7	·3125	2	7	·5625	3	7	·8125
0	8	·0714	1	8	·3214	2	8	·5714	3	8	·8214
0	9	·0803	1	9	·3303	2	9	·5803	3	9	·8303
0	10	·0893	1	10	·3393	2	10	·5893	3	10	·8393
0	11	·0982	1	11	·3482	2	11	·5982	3	11	·8482
0	12	·1071	1	12	·3571	2	12	·6071	3	12	·8571
0	13	·1161	1	13	·3661	2	13	·6161	3	13	·8661
0	14	·125	1	14	·375	2	14	·625	3	14	·875
0	15	·1339	1	15	·3839	2	15	·6339	3	15	·8839
0	16	·1429	1	16	·3929	2	16	·6429	3	16	·8929
0	17	·1518	1	17	·4018	2	17	·6518	3	17	·9018
0	18	·1607	1	18	·4107	2	18	·6607	3	18	·9107
0	19	·1696	1	19	·4196	2	19	·6696	3	19	·9196
0	20	·1786	1	20	·4286	2	20	·6786	3	20	·9286
0	21	·1875	1	21	·4375	2	21	·6875	3	21	·9375
0	22	·1964	1	22	·4464	2	22	·6964	3	22	·9464
0	23	·2054	1	23	·4554	2	23	·7054	3	23	·9554
0	24	·2143	1	24	·4643	2	24	·7143	3	24	·9643
0	25	·2232	1	25	·4732	2	25	·7232	3	25	·9732
0	26	·2322	1	26	·4822	2	26	·7322	3	26	·9822
0	27	·2411	1	27	·4911	2	27	·7411	3	27	·9911

Decimal Equivalents of Pounds and Ounces.

ozs.	lbs.	ozs.	lbs.	ozs.	lbs.	ozs.	lbs.	ozs.	lbs.
¼	·015625	3	·1875	6½	·40625	10	·625	13½	·84375
½	·03125	3½	·21875	7	·4375	10½	·65625	14	·875
¾	·046875	4	·25	7½	·46875	11	·6875	14½	·90625
1	·0625	4½	·28125	8	·5	11½	·71875	15	·9375
1½	·09375	5	·3125	8½	·53125	12	·75	15½	·96875
2	·125	5½	·34375	9	·5625	12½	·78125	16	1·0
2½	·15625	6	·375	9½	·59375	13	·8125		

Table for the Conversion of Percentage into Cwts. and Lbs. per Ton, and into Lbs. per Cwt.

Per Cent.	Per Ton.		Per Cwt.	Per Cent.	Per Ton.		Per Cwt.
	Cwts.	Lbs.	Lbs.		Cwts.	Lbs.	Lbs.
1	—	22·4	1·12	26	5	22·4	29·12
2	—	44·8	2·24	27	5	44·8	30·24
3	—	67·2	3·36	28	5	67·2	31·36
4	—	89·6	4·48	29	5	89·6	32·48
5	1	0	5·60	30	6	0	33·60
6	1	22·4	6·72	31	6	22·4	34·72
7	1	44·8	7·84	32	6	44·8	35·84
8	1	67·2	8·96	33	6	67·2	36·96
9	1	89·6	10·08	34	6	89·6	38·08
10	2	0	11·20	35	7	0	39·20
11	2	22·4	12·32	36	7	22·4	40·32
12	2	44·8	13·44	37	7	44·8	41·44
13	2	67·2	14·56	38	7	67·2	42·56
14	2	89·6	15·68	39	7	89·6	43·68
15	3	0	16·8	40	8	0	44·80
16	3	22·4	17·92	41	8	22·4	45·92
17	3	44·8	19·04	42	8	44·8	47·04
18	3	67·2	20·16	43	8	67·2	48·16
19	3	89·6	21·28	44	8	89·6	49·28
20	4	0	22·40	45	9	0	50·40
21	4	22·4	23·52	46	9	22·4	51·52
22	4	44·8	24·64	47	9	44·8	52·64
23	4	67·2	25·76	48	9	67·2	53·76
24	4	89·6	26·88	49	9	89·6	54·88
25	5	0	28·00	50	10	0	56·00

TABLE FOR THE CONVERSION OF PERCENTAGE INTC CWTS. AND LBS, &c.—*continued.*

Per Cent.	Per Ton.		Per Cwt.	Per Cent.	Per Ton.		Per Cwt.
	Cwts.	Lbs.	Lbs.		Cwts.	Lbs.	Lbs.
51	10	22·4	57·12	76	15	22·4	85·12
52	10	44·8	58·24	77	15	44·8	86·24
53	10	67·2	59·36	78	15	67·2	87·36
54	10	89·6	60·48	79	15	89·6	88·48
55	11	0	61·60	80	16	0	89·60
56	11	22·4	62·72	81	16	22·4	90·72
57	11	44·8	63·84	82	16	44·8	91·84
58	11	67·2	64·96	83	16	67·2	92·96
59	11	89·6	66·08	84	16	89·6	94·08
60	12	0	67·20	85	17	0	95·20
61	12	22·4	68·32	86	17	22·4	96·32
62	12	44·8	69·44	87	17	44·8	97·44
63	12	67·2	70·56	88	17	67·2	98·56
64	12	89·6	71·68	89	17	89·6	99·68
65	13	0	72·80	90	18	0	100·80
66	13	22·4	73·92	91	18	22·4	101·92
67	13	44 8	75·04	92	18	44·8	103·04
68	13	67·2	76·16	93	18	67·2	104·16
69	13	89·6	77·28	94	18	89·6	105·28
70	14	0	78·40	95	19	0	106·40
71	14	22·4	79·52	96	19	22·4	107·52
72	14	44·8	80·64	97	19	44·8	108·64
73	14	67·2	81·76	98	19	67·2	109·76
74	14	89·6	82·88	99	19	89·6	110·88
75	15	0	84·00	100	20	0	112·00

Comparison of Different Thermometers.

Centigrade or Celsius.	Réaumur.	Fahrenheit.	Centigrade or Celsius.	Réaumur.	Fahrenheit.
+260	+208	+500	+225	+180	+437
259	207·20	498·20	224	179·20	435·20
258	206·40	496·40	223	178·40	433·40
257	205·60	494·60	222	177·60	431·60
256	204·80	492·80	221	176·80	429·80
255	204	491	220	176	428
254	203·20	489·20	219	175·20	426·20
253	202·40	487·40	218	174·40	424·40
252	201·60	485·60	217	173·60	422·60
251	200·80	483·80	216	172·80	420·80
250	200	482	215	172	419
249	199·20	480·20	214	171·20	417·20
248	198·40	478·40	213	170·40	415·40
247	197·60	476·60	212	169·60	413·60
246	196·80	474·80	211	168·80	411·80
245	196	473	210	168	410
244	195·20	471·20	209	167·20	408·20
243	194·40	469·40	208	166·40	406·40
242	193·60	467·60	207	165·60	404·60
241	192·80	465·80	206	164·80	402·80
240	192	464	205	164	401
239	191·20	462·20	204	163·20	399·20
238	190·40	460·40	203	162·40	397·40
237	189·60	458·60	202	161·60	395·60
236	188·80	456·80	201	160·80	393·80
235	188	455	200	160	392
234	187·20	453·20	199	159·20	390·20
233	186·40	451·40	198	158·40	388·40
232	185·60	449·60	197	157·60	386·60
231	184·80	447·80	196	156·80	384·80
230	184	446	195	156	383
229	183·20	444·20	194	155·20	381·20
228	182·40	442·40	193	154·40	379·40
227	181·60	440·60	192	153·60	377·60
226	180·80	438·80	191	152·80	375·80

COMPARISON OF DIFFERENT THERMOMETERS—*continued.*

Centigrade or Celsius.	Réaumur.	Fahrenheit.	Centigrade or Celsius.	Réaumur.	Fahrenheit.
+190	+152	+374	+155	+124	+311
189	151·20	372·20	154	123·20	309·20
188	150·40	370·40	153	122·40	307·40
187	149·60	368·60	152	121·60	305·60
186	148·80	366·80	151	120·80	303·80
185	148	365	150	120	302
184	147·20	363·20	149	119·20	300·20
183	146·40	361·40	148	118·40	298·40
182	145·60	359·60	147	117·60	296·60
181	144·80	357·80	146	116·80	294·80
180	144	356	145	116	293
179	143·20	354·20	144	115·20	291·20
178	142·40	352·40	143	114·40	289·40
177	141·60	350·60	142	113·60	287·60
176	140·80	348·80	141	112·80	285·80
175	140	347	140	112	284
174	139·20	345·20	139	111·20	282·20
173	138·40	343·40	138	110·40	280·40
172	137·60	341·60	137	109·60	278·60
171	136·80	339·80	136	108·80	276·80
170	136	338	135	108	275
169	135·20	336·20	134	107·20	273·20
168	134·40	334·40	133	106·40	271·40
167	133·60	332·60	132	105·60	269·60
166	132·80	330·80	131	104·80	267·80
165	132	329	130	104	266
164	131·20	327·20	129	103·20	264·20
163	130·40	325·40	128	102·40	262·40
162	129·60	323·60	127	101·60	260·60
161	128·80	321·80	126	100·80	258·80
160	128	320	125	100	257
159	127·20	318·20	124	99·20	255·20
158	126·40	316·40	123	98·40	253·40
157	125·60	314·60	122	97·60	251·60
156	124·80	312·80	121	96·80	249·80

COMPARISON OF DIFFERENT THERMOMETERS—*continued.*

Centigrade or Celsius.	Réaumur.	Fahrenheit.	Centigrade or Celsius.	Réaumur.	Fahrenheit.
+120	+96	+248	+85	+68	+185
119	95·20	246·20	84	67·20	183·20
118	94·40	244·40	83	66·40	181·40
117	93·60	242·60	82	65·60	179·60
116	92·80	240·80	81	64·80	177·80
115	92	239	80	64	176
114	91·20	237·20	79	63·20	174·20
113	90·40	235·40	78	62·40	172·40
112	89·60	233·60	77	61·60	170·60
111	88·80	231·80	76	60·80	168·80
110	88	230	75	60	167
109	87·20	228·20	74	59·20	165·20
108	86·40	226·40	73	58·40	163·40
107	85·60	224·60	72	57·60	161·60
106	84·80	222·80	71	56·80	159·80
105	84	221	70	56	158
104	83·20	219·20	69	55·20	156·20
103	82·40	217·40	68	54·40	154·40
102	81·60	215·60	67	53·60	152·60
101	80·80	213·80	66	52·80	150·80
100	80	212	65	52	149
99	79·20	210·20	64	51·20	147·20
98	78·40	208·40	63	50·40	145·40
97	77·60	206·60	62	49·60	143·60
96	76·80	204·80	61	48·80	141·80
95	76	203	60	48	140
94	75·20	201·20	59	47·20	138·20
93	74·40	199·40	58	46·40	136·40
92	73·60	197·60	57	45·60	134·60
91	72·80	195·80	56	44·80	132·80
90	72	194	55	44	131
89	71·20	192·20	54	43·20	129·20
88	70·40	190·40	53	42·40	127·40
87	69·60	188·60	52	41·60	125·60
86	68·80	186·80	51	40·80	123·80

COMPARISON OF DIFFERENT THERMOMETERS—*continued.*

Centigrade or Celsius.	Réaumur.	Fahrenheit.	Centigrade or Celsius.	Réaumur.	Fahrenheit.
+50	+40	+122	+20	+16	+68
49	39·20	120·20	19	15·20	66·20
48	38·40	118·40	18	14·40	64·40
47	37·60	116·60	17	13·60	62·60
46	36·80	114·80	16	12·80	60·80
45	36	113	15	12	59
44	35·20	111·20	14	11·20	57·20
43	34·40	109·40	13	10·40	55·40
42	33·60	107·60	12	9·60	53·60
41	32·80	105·80	11	8·80	51·80
40	32	104	10	8	50
39	31·20	102·20	9	7·20	48·20
38	30·40	100·40	8	6·40	46·40
37	29·60	98·60	7	5·60	44·60
36	28·80	96·80	6	4·80	42·80
35	28	95	5	4	41
34	27·20	93·20	4	3·20	39·20
33	26·40	91·40	3	2·40	37·40
32	25·60	89·60	2	1·60	35·60
31	24·80	87·80	1	0·80	33·80
30	24	86	0	0	32
29	23·20	84·20	1	0·80	30·20
28	22·40	82·40	2	1·60	28·40
27	21·60	80·60	3	2·40	26·60
26	20·80	78·80	4	3·20	24·80
25	20	77	5	4	23
24	19·20	75·20	6	4·80	21·20
23	18·40	73·40	7	5·60	19·40
22	17·60	71·60	8	6·40	17·60
21	16·80	69·80	9	7·20	15·80
			10	8	14

WALKER'S LIST OF FRIGORIFIC MIXTURES.

		Thermometer sinks Degrees F.
Ammonium Nitrate	1 part	From + 40° to + 4°
Water	1 "	
Ammonium Chloride	5 parts	From + 50° to + 10°
Potassium Nitrate	5 "	
Water	16 "	
Ammonium Chloride	5 parts	From + 50° to + 4°
Potassium Nitrate	5 "	
Sodium Sulphate	8 "	
Water	16 "	
Sodium Nitrate	3 parts	From + 50° to − 3°
Nitric acid, diluted	2 "	
Ammonium Nitrate	1 part	From + 50° to − 7°
Sodium Carbonate	1 "	
Water	1 "	
Sodium Phosphate	9 parts	From + 50° to − 12°
Nitric acid, diluted	4 "	
Sodium Sulphate	5 parts	From + 50° to + 3°
Sulphuric acid, diluted	4 "	
Sodium Sulphate	6 parts	From + 50° to − 10°
Ammonium Chloride	4 "	
Potassium Nitrate	2 "	
Nitric acid, diluted	4 "	
Sodium Sulphate	6 parts	From + 50° to − 40°
Ammonium Nitrate	5 "	
Nitric acid, diluted	4 "	

WALKER'S LIST OF FRIGORIFIC MIXTURES—*continued.*

Mixture	Parts	Thermometer sinks Degrees F.
Snow, or pounded ice	2 parts	to $-5°$
Sodium Chloride	1 „	
Snow, or pounded ice	5 parts	to $-12°$
Sodium Chloride	2 „	
Ammonium Chloride	1 „	
Snow, or pounded ice	24 parts	to $-18°$
Sodium Chloride	10 „	
Ammonium Chloride	5 „	
Potassium Nitrate	5 „	
Snow, or pounded ice	12 parts	to $-25°$
Sodium Chloride	5 „	
Ammonium Nitrate	5 „	
Snow	3 parts	From $+32°$ to $-23°$
Sulphuric acid, diluted	2 „	
Snow	8 parts	From $+32°$ to $-27°$
Hydrochloric acid	5 „	
Snow	7 parts	From $+32°$ to $-30°$
Nitric acid, diluted	4 „	
Snow	4 parts	From $+32°$ to $-40°$
Calcium Chloride	5 „	
Snow	2 parts	From $+32°$ to $-50°$
Calcium Chloride, crystallized	3 „	
Snow	3 parts	From $+32°$ to $-51°$
Potash	4 „	

TABLE SHOWING A COMPARISON OF THE DEGREES OF WEDGEWOOD'S PYROMETER WITH DEGREES C. AND DEGREES R.

Wedgewood.	°R.	°C.	
0	460	578	
1	518	648	Incipient glowing.
2	576	720	
3	634	793	Incipient cherry red.
4	692	865	
5	750	938	Red.
6	808	1010	
7	866	1083	Orange.
8	924	1155	Yellow.
9	982	1228	White.
10	1040	1300	Steel melts, 1350° C.
11	1098	1373	Strong white.
12	1156	1445	Dazzling white.
13	1214	1518	
14	1272	1590	
15	1330	1663	Wrought iron melts, 1600° C.
16	1388	1735	
17	1446	1808	
18	1504	1880	
19	1562	1953	
20	1620	2023	
21	1678	2098	
22	1736	2170	
23	1794	2243	
24	1852	2315	
25	1910	2388	
26	1968	2460	
27	2026	2533	Platinum melts, 2534° C.
28	2084	2605	
29	2142	2678	Iridium melts, 2700° C.
30	2200	2750	

The following table affords a somewhat rough method of estimating high temperatures :—

	°C.		°C.
Just glowing in the dark ..	525	Bright cherry red	1000
Dark red ..	700	Orange	1150
Cherry red ..	908	White	1300
		Dazzling white	1500

TABLE SHOWING A COMPARISON OF THE DEGREES OF THE MERCURIAL THERMOMETER WITH THOSE OF THE AIR THERMOMETER.

(According to Magnus.)

Degrees (C) of the Mercurial Thermometer.	Degrees of the Air Thermometer.
100	100·00
150	148·74
200	197·49
250	245·39
300	294·51
330	320·92

Table for the Correction of Thermometers in Determination of Boiling Points, &c.

T being the temperature indicated by the thermometer.

N the number of degrees occupying the length of the mercurial column projecting out of the apparatus, &c.

t the temperature of the column taken as the point $T - \frac{1}{2} N$, then the following corrections must be added to T.

N	$T - t = 20°$	50°	80°	100°	120°
20	0·06	0·15	0·25	0·31	0·37
40	0·12	0·31	0·50	0·62	0·74
60	0·18	0·46	0·74	0·92	1·11
80	0·25	0·62	0·99	1·23	1·48
100	0·31	0·77	1·23	1·54	1·85
120	0·37	0·92	1·48	1·85	2·26
140	0·43	1·08	1·72	2·16	2·59
160	0·49	1·23	1·97	2·46	2·96
180	0·56	1·39	2·22	2·77	3·33
200	0·62	1·54	2·46	3·08	3·70

Coefficients of Expansion (Linear) of

	Glass.	Brass.
1	·000007567	·000018782
2	·000015133	·000037564
3	·000022700	·000056346
4	·000030267	·000075128
5	·000037833	·000093910
6	·000045400	·000112692
7	·000052967	·000131474
8	·000060533	·000150256
9	·000068100	·000169038

Comparison of the British and Metrical Barometers.

Inches.	Millimetres.	Inches.	Millimetres.	Inches.	Millimetres.
27·00	685·788	27·50	698·487	28·00	711·187
27·02	686·296	27·52	698·995	28·02	711·695
27·04	686·804	27·54	699·503	28·04	712·203
27·06	687·312	27·56	700·011	28·06	712·711
27·08	687·820	27·58	700·519	28·08	713·219
27·10	688·328	27·60	701·027	28·10	713·727
27·12	688·835	27·62	701·535	28·12	714·235
27·14	689·343	27·64	702·043	28·14	714·743
27·16	689·851	27·66	702·551	28·16	715·251
27·18	690·359	27·68	703·059	28·18	715·759
27·20	690·867	27·70	703·567	28·20	716·267
27·22	691·375	27·72	704·075	28·22	716·775
27·24	691·883	27·74	704·583	28·24	717·283
27·26	692·391	27·76	705·091	28·26	717·791
27·28	692·899	27·78	705·599	28·28	718·299
27·30	693·407	27·80	706·107	28·30	718·807
27·32	693·915	27·82	706·615	28·32	719·315
27·34	694·423	27·84	707·123	28·34	719·823
27·36	694·931	27·86	707·631	28·36	720·331
27·38	695·439	27·88	708·139	28·38	720·839
27·40	695·947	27·90	708·647	28·40	721·347
27·42	696·455	27·92	709·155	28·42	721·855
27·44	696·963	27·94	709·663	28·44	722·363
27·46	697·471	27·96	710·171	28·46	722·871
27·48	697·979	27·98	710·679	28·48	723·379

Comparison of the British and Metrical Barometers—*continued.*

Inches.	Millimetres.	Inches.	Millimetres.	Inches.	Millimetres.
28·50	723·887	29·00	736·587	29·50	749·286
28·52	724·395	29·02	737·095	29·52	749·794
28·54	724·903	29·04	737·603	29·54	750·302
28·56	725·411	29·06	738·111	29·56	750·810
28·58	725·919	29·08	738·619	29·58	751·318
28·60	726·427	29·10	739·127	29·60	751·826
28·62	726·935	29·12	739·635	29·62	752·334
28·64	727·443	29·14	740·143	29·64	752·842
28·66	727·951	29·16	740·651	29·66	753·350
28·68	728·439	29·18	741·159	29·68	753·858
28·70	728·967	29·20	741·667	29·70	754·366
28·72	729·475	29·22	742·175	29·72	754·874
28·74	729·983	29·24	742·683	29·74	755·382
28·76	730·491	29·26	743·191	29·76	755·890
28·78	730·999	29·28	743·699	29·78	756·398
28·80	731·507	29·30	744·206	29·80	756·906
28·82	732·015	29·32	744·714	29·82	757·414
28·84	732·523	29·34	745·222	29·84	757·922
28·86	733·031	29·36	745·730	29·86	758·430
28·88	733·539	29·38	746·228	29·88	758·938
28·90	734·047	29·40	746·746	29·90	759·446
28·92	734·551	29·42	747·254	29·92	759·954
28·94	735·063	29·44	747·762	29·94	760·462
28·96	735·571	29·46	748·270	29·96	760·970
28·98	736·079	29·48	748·778	29·98	761·478

COMPARISON OF THE BRITISH AND METRICAL BAROMETERS—*continued.*

Inches.	Millimetres.	Inches.	Millimetres.	Inches.	Millimetres.
30·00	761·986	30·34	770·622	30·68	779·258
30·02	762·494	30·36	771·130	30·70	779·766
30·04	763·002	30·38	771·638	30·72	780·274
30·06	763·510	30·40	772·146	30·74	780·782
30·08	764·018	30·42	772·654	30·76	781·290
30·10	764·526	30·44	773·162	30·78	781·798
30·12	765·034	30·46	773·670	30·80	782·306
30·14	765·542	30·48	774·178	30·82	782·814
30·16	766·050	30·50	774·686	30·84	783·322
30·18	766·558	30·52	775·194	30·86	783·830
30·20	767·066	30·54	775·702	30·88	784·338
30·22	767·574	30·56	776·210	30·90	784·846
30·24	768·082	30·58	776·718	30·92	785·354
30·26	768·590	30·60	777·226	30·94	785·862
30·28	769·098	30·62	777·734	30·96	786·370
30·30	769·606	30·64	778·242	30·98	786·878
30·32	770·114	30·66	778·750		

REDUCTION OF BAROMETERS TO 0° C. (Exact Formula).

$$h = \mathrm{H}\frac{5550}{5550 + t}\ (1\cdot + k\,t).$$

h = corrected heights.
H = observed height, corrected for capillarity.
t = temperature at time of observation.
k = coef. of linear expansion of scale (see page 51).

Correction to be applied to Barometers, the Scales of which are Engraved on Glass, to reduce the Observations to 32° F. (0° C.).

Temp, °C.	Temp. °F.	Inches, 28·0	Inches, 28·5	Inches, 29·0	Inches, 29·5	Inches, 30·0	Inches, 30·5	Inches, 31·0	Inches, 31·5
− 3·88	25	+ ·017	+ ·017	+ ·017	+ ·018	+ ·018	+ ·018	+ ·019	+ ·019
− 1·11	30	+ ·005	+ ·005	+ ·005	+ ·005	+ ·005	+ ·005	+ ·005	+ ·005
1·66	35	− ·007	− ·007	− ·007	− ·008	− ·008	− ·008	− ·008	− ·008
4·44	40	− ·019	− ·020	− ·020	− ·020	− ·021	− ·021	− ·021	− ·022
7·22	45	− ·031	− ·032	− ·032	− ·033	− ·033	− ·034	− ·035	− ·036
10·00	50	− ·043	− ·044	− ·045	− ·046	− ·046	− ·047	− ·048	− ·049
12·77	55	− ·055	− ·056	− ·057	− ·058	− ·059	− ·060	− ·061	− ·062
15·55	60	− ·067	− ·068	− ·069	− ·071	− ·072	− ·074	− ·075	− ·076
18·33	65	− ·079	− ·081	− ·082	− ·083	− ·085	− ·086	− ·088	− ·089
21·11	70	− ·091	− ·093	− ·094	− ·096	− ·098	− ·100	− ·101	− ·103
23·88	75	− ·103	− ·105	− ·106	− ·109	− ·111	− ·114	− ·116	− ·118

CORRECTIONS TO BE APPLIED TO REDUCE BAROMETERS TO 0° C.

The correction is additive for negative degrees, and subtractive for positive degrees.

With Scales engraved on Glass.

Height observed=	700 mm.	705 mm.	710 mm.	715 mm.	720 mm.	725 mm.
$t = 1°$ C	·120	·121	·121	·122	·123	·124
2	·240	·241	·243	·245	·246	·248
3	·359	·362	·364	·367	·370	·372
4	·479	·483	·486	·489	·493	·496
5	·599	·603	·607	·612	·616	·620
6	·719	·724	·729	·734	·739	·744
7	·838	·844	·850	·856	·862	·868
8	·958	·965	·972	·979	·986	·992
9	1·078	1·086	1·093	1·101	1·109	1·116
10	1·198	1·206	1·215	1·223	1·232	1·240

Height observed=	730 mm.	735 mm.	740 mm.	745 mm.	750 mm.	755 mm.
$t = 1°$ C.	·125	·126	·127	·127	·128	·129
2	·250	·252	·258	·255	·257	·258
3	·375	·377	·380	·382	·385	·388
4	·500	·503	·506	·510	·513	·517
5	·625	·629	·633	·637	·642	·646
6	·749	·755	·760	·765	·770	·775
7	·874	·880	·886	·892	·898	·904
8	·999	1·006	1·013	1·020	1·027	1·033
9	1·124	1·132	1·140	1·147	1·155	1·163
10	1·249	1·258	1·266	1·275	1·283	1·292

Height observed=	760 mm.	765 mm.	770 mm.	775 mm.	780 mm.
$t = 1°$ C.	·130	·131	·132	·133	·133
2	·260	·262	·263	·265	·267
3	·390	·393	·395	·398	·400
4	·520	·524	·527	·530	·534
5	·650	·654	·659	·663	·667
6	·780	·785	·790	·796	·801
7	·810	·916	·922	·928	·934
8	1·040	1·047	1·054	1·061	1·068
9	1·170	1·178	1·186	1·193	1·201
10	1·300	1·309	1·317	1·326	1·335

CORRECTIONS TO BE APPLIED TO BAROMETERS—*continued.*

The correction is additive for negative degrees, and subtractive for positive degrees.

With Scales engraved on Brass.

Height observed =	700 mm.	705 mm.	710 mm.	715 mm.	720 mm.	725 mm.
$t = 1°$ C.	·1130	·1138	·1146	·1154	·1162	·1170
2	·226	·228	·229	·231	·232	·234
3	·339	·341	·344	·346	·349	·351
4	·452	·455	·458	·462	·465	·468
5	·565	·569	·573	·577	·581	·585
6	·678	·683	·688	·692	·697	·702
7	·791	·797	·802	·808	·813	·819
8	·904	·910	·917	·923	·930	·936
9	1·017	1·024	1·031	1·039	1·046	1·053

Height observed =	730 mm.	735 mm.	740 mm.	745 mm.	750 mm.	755 mm.
$t = 1°$ C.	·1128	·1186	·1194	·1202	·1210	·1218
2	·236	·237	·239	·240	·242	·244
3	·353	·356	·358	·361	·363	·365
4	·471	·474	·478	·481	·484	·487
5	·589	·593	·597	·601	·605	·609
6	·707	·712	·716	·721	·726	·731
7	·825	·830	·836	·841	·847	·853
8	·942	·949	·955	·962	·968	·974
9	1·060	1·067	1·075	1·082	1·089	1·096

Height observed =	760 mm.	765 mm.	770 mm.	775 mm.	780 mm.
$t = 1°$ C.	·1227	·1235	·1243	·1251	·1259
2	·245	·247	·249	·250	·252
3	·368	·370	·373	·375	·378
4	·491	·494	·497	·500	·504
5	·613	·617	·621	·625	·629
6	·736	·741	·746	·751	·755
7	·859	·864	·870	·876	·881
8	·982	·988	·994	1·001	1·007
9	1·104	1·111	1·119	1·126	1·133

Correction to be Added to Barometers for Capillarity.

F = height of meniscus in mm. Correction is in mm.

Radius of Tube.	F=·2	·3	·4	·5	·6	·7	·8	·9	1·0	1·1	1·2	1·3	1·4	1·5	1·6
mm.															
2	·60	·89	1·16	1·41	1·65	1·86	2·05	2·21	2·35	—	—	—	—	—	—
2·2	·49	·72	·95	1·16	1·36	1·54	1·71	1·83	1·98	20·9	—	—	—	—	—
2·4	·40	·60	·79	·97	1·14	1·29	1·44	1·57	1·68	1·78	1·87	—	—	—	—
2·6	·34	·50	·66	·81	·96	1·09	1·22	1·33	1·44	1·53	1·61	1·68	—	—	—
2·8	·29	·43	·56	·69	·82	·93	1·04	1·14	1·24	1·32	1·39	1·46	1·51	—	—
3	·24	·36	·48	·59	·70	·80	·90	·99	1·07	1·14	1·21	1·27	1·32	1·37	—
3·2	·21	·31	·41	·51	·60	·69	·78	·86	·93	1·00	1·06	1·11	1·16	1·20	1·24
3·4	·18	·27	·36	·44	·52	·60	·68	·75	·81	·87	·93	·98	1·02	1·06	1·10
3·6	·16	·23	·31	·38	·46	·52	·59	·65	·71	·76	·81	·86	·90	·94	·97
3·8	·14	·21	·27	·34	·40	·46	·52	·57	·62	·67	·72	·76	·80	·83	·86
4	·12	·18	·24	·30	·35	·40	·46	·50	·55	·59	·64	·67	·71	·74	·77
4·2	·11	·16	·21	·26	·31	·36	·40	·45	·49	·53	·56	·60	·63	·66	·68
4·4	·09	·14	·19	·23	·27	·32	·36	·40	·45	·47	·50	·53	·56	·59	·61
4·6	·08	·12	·16	·20	·24	·23	·32	·35	·38	·42	·45	·47	·50	·52	·54
4·8	·07	·11	·15	·18	·22	·25	·28	·31	·34	·37	·40	·42	·45	·47	·49
5	·07	·10	·13	·16	·19	·22	·25	·28	·31	·33	·35	·38	·40	·42	·44
5·2	·06	·09	·12	·14	·17	·20	·22	·25	·27	·30	·32	·34	·36	·37	·39
5·4	·05	·08	·10	·13	·15	·18	·20	·22	·24	·26	·28	·30	·32	·34	·35
5·6	·05	·07	·09	·12	·14	·16	·18	·20	·22	·24	·26	·27	·29	·30	·32
5·8	·04	·06	·08	·10	·12	·14	·16	·18	·20	·21	·23	·24	·26	·27	·28
6	·04	·06	·07	·09	·11	·13	·14	·16	·18	·19	·21	·22	·23	·24	·25

Specific and Atomic Heat of Elements.

Elements.	Specific Heat of Equal Weights.	Equivalent.	Specific Heat × Equivalent.	Atomic Weight.	Specific Heat × Atomic Weight.	Weights containing Equal Quantities of Heat.
Diamond ..	0·1468	6	0·8808	48 ?	6·0464	44·84
Graphite ..	0·2018	6	1·2108	33 ?	6·6594	32·79
Wood charcoal ..	0·2415	6	1·4490	..	..	27·27
Silicon, fused	0·1750	14	2·450	35 ?	6·125	37·63
„ crystal.	0·1767	..	..	..	..	37·12
Boron, crystal	0·250	10·9	2·725	..	..	26·34
Sulphur, native	0·1776	16·0	2·8416	32	5·6832	32·51
Selenium ..	0·0837	39·7	3·3145	79·5	6·6541	86·47
Tellurium ..	0·04737	64·5	3·0553	129	6·1107	139·02
Magnesium ..	0·2499	12·0	2·9988	24	5·9976	26·35
Zinc	0·09555	32·5	3·1054	65	6·2108	68·92
Cadmium ..	0·05669	56·0	3·1741	112	6·3482	116·17
Aluminium ..	0·2143	13·7	2·9359	27·5	5·8730	30·73
Iron	0·11379	28·0	3·861	56	6·3722	57·87
Nickel	0·10863	29·5	3·2045	59	6·4090	59·44
Cobalt	0·10696	29·5	3·1553	59	6·3106	61·23
Manganese ..	0·1217	27·5	3·3467	55	6·6934	51·11
Tin	0·05623	59·0	3·3178	118	6·6356	117·12
Tungsten ..	0·03343	92·0	3·0746	184	6·1492	197·06
Molybdenum	0·07218	48·0	3·465	96	6·931	91·24
Copper	0·09515	31·7	3·0162	63·5	6·0419	66·21
Lead	0·03140	103·5	3·2499	207	6·4999	209·73

SPECIFIC AND ATOMIC HEAT, &c.—*continued.*

Elements.	Specific Heat of Equal Weights.	Equivalent.	Specific Heat × Equivalent.	Atomic Weight.	Specific Heat × Atomic Weight.	Weights containing Equal Quantities of Heat.
Mercury, solid	0·03192	100·0	3·1920	200	6·3840	206·32
„ liquid	0·03332	100·0	3·3320	200	6·6640	..
Platinum ..	0·03243	98·6	3·1976	197·2	6·3952	203·07
Potassium ..	0·16956	..	..	39	6·6128	38·84
Sodium.. ..	0·29340	..	..	23	6·7480	22·40
Phosphorus..	0·18870	..	..	31	5·8497	34·90
Silver	0·05701	..	..	108	6·1570	115·52
Gold	0·03244	..	..	196·6	6·3777	203·01

TABLE SHOWING THE PHYSICAL STATE OF THE METALS.

Hard and Brittle Metals.

Antimony, Arsenic, Chromium, Iridium, Cobalt (?), Manganese (?), Molybdenum, Ruthenium, Bismuth, Tungsten.

Hard but Ductile Metals.

Aluminium, Cadmium, Copper, Magnesium, Nickel, Palladium, Platinum, Rhodium, Silver, Uranium, Zinc (only between 100° and 150°).

Soft Metals.

Lead, Calcium, Cerium, Iron (chemically pure), Gold, Indium, Potassium, Lithium, Sodium, Rubidium, Strontium, Thallium, Tin.

ATOMIC HEAT OF COMPOUNDS.

Class of Compounds.	General Formula.	Specific Heat × Atomic Weight.	Atomic Heat.
Protoxides ..	$M^{II}O$	11·30	5·65
Sesquioxides ..	$M_2^{III}O_3$	27·15	5·43
Dioxides ..	$M^{IV}O_2$	13·84	4·61
Trioxides ..	$M^{VI}O_3$	18·98	4·74
Sulphides ..	$M^{II}S$	18·88	6·29
Sesquisulphides	$M_2^{III}S_3$	29·77	5·95
Disulphides ..	$M^{IV}S_2$	20·8	6·93
Chlorides ..	MCl	12·69	6·34
Dichlorides ..	$M^{II}Cl_2$	18·72	6·24
Trichlorides ..	$M^{III}Cl_3$	30·36	7·59
Bromides ..	MBr	13·70	6·85
Dibromides ..	$M^{II}Br_2$	19·36	6·45
Iodides	MI	13·46	6·73
Biniodides ..	$M^{II}I_2$	19·35	6·45
Nitrates ..	MNO_3	24·137	4·82
Chlorates ..	$MClO_3$	25·68	5·13
Sulphates ..	M_2SO_4	33·04	4·72
Carbonates ..	M_2CO_3	29·48	4·91
Phosphates ..	$M_3^{II}2PO_4$	63·66	4·89

SPECIFIC AND ATOMIC HEAT OF ORGANIC LIQUIDS.

Compound.	Empirical Formula.	Molecular Weight.	Specific Heat of Equivalent Weights.	Atomic Heat.
Wood spirit	CH_4O	32	·613	20·64
Formic acid	CH_2O_2	46	·536	24·65
Sulphide of carbon	CS_2	76	·2206	16·77
Alcohol	C_2H_6O	46	·615	28·29
Acetic acid	$C_2H_4O_2$	60	·508	30·54
Acetone	C_3H_6O	58	·530	30·74
Methyl acetate	$C_3H_6O_2$	74	·513	37·96
Formic ether	$C_3H_6O_2$	74	·485	35·89
Ether	$C_4H_{10}O$	74	·517	37·22
Acetic ether	$C_4H_8O_2$	88	·474	41·71
Butyric acid	$C_4H_8O_2$	88	·503	45·30
Ethyl	$C_4H_8O_2$	88	·496	43·65
Amylic alcohol	$C_5H_{12}O$	88	·564	49·63
Benzol	C_6H_6	78	·450	35·10
Nitro-benzol	$C_6H_5NO_2$	123	·3499	43·04
Naphthaline	$C_{10}H_8$	123	·4159	53·20
Oil of turpentine	$C_{10}H_{16}$	138	·467	63·51
Terebenthine	$C_{10}H_{16}$	136	·4267	57·93

Specific Heats of Gases and Vapours.

	For Equal Volumes.	For Equal Weights.
Air	0·2374 0·2389	0·2374
Oxygen	0·2405	0·2175
Nitrogen	0·2368	0·2438
Hydrogen	0·2359	3·4090
Chlorine	0·2964	0·1210
Bromine	0·3040	0 0555
Nitrous oxide	0·3447 0·3014	0·2262
Nitric oxide	0 2406	0·2317
Carbonic oxide	0·2370 0·2346	0·2450
Carbonic anhydride ..	0·3307 0·2985	0·20246
Carbonic disulphide ..	0·4122	0·1569
Ammonia	0·2996 0·2952	0·5083
Marsh gas	0·3277	0·5929
Ethylene	0·4160	0·4040
Sulphurous anhydride	0·3414	0·1553
Hydrochloric acid ..	0·2333	0·1852
Sulphuretted hydrogen	0·2857	0·2432
Water	0·2989	0·4805
Alcohol	0·7171	0·4534
Ether	1·2266	0·4796
Chloroform	0·6461	0·1567
Benzol	1·0114	0·3754
Acetone	0·8244	0·4125
Spirits of turpentine ..	2·3776	0·5061

TABLE SHOWING THE RELATIONS EXISTING BETWEEN THE VOLUME OF THE MORE IMPORTANT COMBUSTIBLE GASES AND THE PRODUCTS OF THE EXPLOSION.

Name of Gas.	Volume of Combustible Gas.	Volume of Oxygen Consumed.	Contraction after Explosion.	Volume of Carbonic Anhydride produced.
Hydrogen, H	1	0·5	1·5	0
Carbonic oxide, CO ..	1	0·5	0·5	1
Methylic hydride, CH_3H	1	2·0	2·0	1
Acetylene, C_2H_2 ..	1	2·5	1·5	2
Olefiant gas, C_2H_4 ..	1	3·0	2·0	2
Methyl, CH_3, CH_3 ..	1	3·5	2·5	2
Ethylic hydride, C_2H_5H	1	3·5	2·5	2
Propylene, C_3H_6 ..	1	4·5	2·5	3
Propylic hydride, C_3H_7H	1	5·0	3·0	3
Butylene, C_4H_8	1	6·0	3·0	4
Ethyl, C_2H_5, C_2H_5 ..	1	6·5	3·5	4
Butylic hydride, C_4H_9H	1	6·5	3·5	4

TABLE SHOWING THE VOLUMES OF VARIOUS GASES ABSORBED BY 1 VOLUME OF WOOD CHARCOAL.

Name.	Gas.	Name.	Gas.
Ammonia..	90	Ethylene	35
Hydrochloric acid ..	85	Carbon oxide.. ..	9·42
Sulphurous anhydride	65	Oxygen	9·25
Hydrogen sulphide	55	Nitrogen	7·5
Nitrous oxide	40	Hydrogen	1·75
Carbonic anhydride	35		

KOPP'S TABLE, SHOWING THE EXPANSION OF WATER FROM 0° C. TO 100° C. (32° F. TO 212° F.).

Temp. Cent.	Temp Fahr.	Volume.	Temp. Cent.	Temp. Fahr.	Volume.
0°	32	1·000000	21	69·8	1·001776
1	33 8	·999947	22	71·6	1·001995
2	35·6	·999908	23	73·4	1·002225
3	37 4	·999885	24	75·2	1·002465
4	39·2	·999877	25	77·0	1 002715
5	41·0	·999883	30	86·0	1·004064
6	42·8	·999903	35	95·0	1·005697
7	44·6	·999938	40	104·0	1·007531
8	46·4	·999986	45	113·0	1·009541
9	48·2	1·000048	50	122·0	1·011766
10	50·0	1·000124	55	131·0	1·014100
11	51·8	1·000213	60	140·0	1·016590
12	53·6	1·000314	65	149·0	1·019302
13	55·4	1·000429	70	158·0	1·022246
14	57·2	1·000556	75	167·0	1·025440
15	59·0	1·000695	80	176·0	1·028581
16	60·8	1·000846	85	185·0	1·031894
17	62·6	1·001010	90	194·0	1·035397
18	64·4	1·001184	95	203·0	1·039094
19	66·2	1·001370	100	212·0	1·042986
20	68·0	1·001567			

Multiples of the Coefficient of Dilation (Cubical) of Ordinary Glass.

T.	From 0° C. to 100° C.	From 0° C. to 150° C.	From 0° C. to 200° C.	From 0° C. to 250° C.	From 0° C. to 300° C.
1	·0000276	·0000284	·0000291	·0000298	·0000306
2	·0000552	·0000568	·0000582	·0000596	·0000612
3	·0000828	·0000852	·0000873	·0000894	·0000918
4	·0001104	·0001136	·0001164	·0001194	·0001224
5	·0001380	·0001420	·0001445	·0001490	·0001530
6	·0001656	·0001704	·0001746	·0001788	·0001836
7	·0001932	·0001988	·0002037	·0002086	·0002142
8	·0002208	·0002277	·0002328	·0002384	·0002448
9	·0002484	·0002556	·0002619	·0002682	·0002754

Table showing the Tension of Mercury Vapour.

° C.	Millim.	° C.	Millim.	° C.	Millim.	° C.	Millim.
0	·02	170	8·091	290	194·46	410	1864
"	"	180	11·000	300	242·15	420	2178
50	·113	190	14·84	310	299·69	430	2533
"	"	200	19·90	320	368·73	440	2934
90	·514	210	26·35	330	450·91	450	3384·35
100	·746	220	34·70	340	548·35	460	3888
110	1·073	230	45·35	350	663·18	470	4450
120	1·534	240	58·82	360	797·74	480	5062
130	2·175	250	75·75	370	954·65	490	5761
140	3·059	260	96·73	380	1195·65	500	6520·25
150	4·266	270	123·01	390	1346·71	510	7354
160	5·900	280	155·17	400	1587·96	520	8265

TABLE SHOWING THE TENSION OF AQUEOUS VAPOUR IN MILLIMETRES OF MERCURY, FROM 30° C. TO 230° C.

Temp.	Tension.	Temp.	Tension.	Temp.	Tension.	Temp.	Tension.
−30	·39	21	18·5	94	610·4	105	907
−25	·61	22	19·7	94·5	622·2	107	972
−10	·9	23	20·9	95	633·8	110	1077
−15	1·4	24	22·7	95·5	645·7	115	1273
−10	2·1	25	23·6	96	657·5	120	1491
− 5	3·1	26	25·0	96·5	669·7	125	1744
− 2	4·0	27	26·6	97	682·0	130	2030
− 1	4·3	28	28·1	97·5	694·6	135	2354
0	4·6	29	29·8	98	707·3	140	2717
1	4·95	30	31·6	98·5	721·2	145	3125
2	5·3	35	41·9	99	732·2	150	3581
3	5·7	40	55·0	99·1	735·9	155	4088
4	6·1	45	71·5	99·2	738·5	160	4551
5	6·5	50	92·0	99·3	741·2	165	5274
6	7·0	55	117·5	99·4	743·8	170	5961
7	7·5	60	148·0	99·5	746·5	175	6717
8	8·0	65	186·0	99·6	749·2	180	7547
9	8·6	70	232·0	99·7	751·9	185	8453
10	9·1	75	287·0	99·8	754·6	190	9443
11	9·7	80	354·0	99·9	757·3	195	10520
12	10·4	85	432·0	100	760	200	11689
13	11·1	90	525·4	100·1	762·7	205	12956
14	11·9	90·5	535·5	100·2	765·5	210	14325
15	12·7	91	545·8	100·4	772·0	215	15801
16	13·5	91·5	556·2	100·6	776·5	220	17390
17	14·4	92	566·8	101	787·0	225	19097
18	15·3	92·5	577·3	102	816	230	20926
19	16·3	93	588·4	103	845	—	—
20	17·4	93·5	599·5	104	876	—	—

Degrees C ..	120	134	144	152	159	171	180	199	213	225
Atmospheres	2	3	4	·5	6	8	10	15	20	25

TENSIONS OF THE VAPOURS OF SOME LIQUIFIABLE GASES IN CENTIMETRES OF MERCURY AT VARIOUS TEMPERATURES C.

Temperature.	Sulphurous Anhydride.	Ammonia.	Carbonic Anhydride.	Nitrous Oxide.	Cyanogen.
−30	28·7	86	—	—	—
−20	48·	140	1515	1570	79
−10	76·3	215	2035	2200	140
0	116·5	318	2700	2740	204
10	180·	457	3500	3420	290
30	343·	870	5610	5170	—
50	622·	1516	—	—	—
100	—	—	—	—	—
120	—	—	—	—	—
150	—	—	—	—	—
Boiling point °C under 760 mm.	−10·08	−38·5	−78·2	−87·9	−20·7

Temperature.	Alcohol.	Ether.	Chloroform.	Benzine.	Ethyl Chloride.	Ethyl Iodide.
−30	—	—	—	—	11·	—
−20	·34	6·9	—	58	18·8	—
−10	·64	11·5	—	1·3	30·2	—
0	1·27	18·4	—	2·5	46·5	4·2
10	2·42	28·7	16	4·5	69·1	6·9
30	7·85	63·5	37	12	139·9	16·9
50	22·0	126·5	75·5	27·1	257·9	36·4
100	169·7	495·	311	134	872·3	—
120	232·2	772·	488	223·5	—	—
150	731·8	—	873	433	—	—
Boiling point °C under 760 mm.	78·26	34·97	60·16	80·36	12·5	72·2

TABLE OF THE PROPERTIES OF SATURATED STEAM.

(Taken from 'Molesworth's Pocket-Book.')

Atmosphere included.		Temperature of Steam. F.	Specific Vol.	No. of Atmospheres.	Atmosphere excluded.	
Lbs. per Sq. In.	Inches of Mercury.				Inches of Mercury.	Lbs. per Sq. Inch.
1	2 0355	102·1	20582	·068	−27·886	−13·7
2	4·0701	126·3	10721	·136	−25·851	−12·7
3	6·1065	141·6	7322	·204	−23·815	−11·7
4	8·142	153·1	5583	·272	−21·780	−10·7
5	10·178	162·3	4527	·340	−19·744	− 9·7
6	12·213	170·2	3813	·408	−17·709	− 8·7
7	14·249	176·9	3298	·476	−15·673	− 7·7
8	16·284	182·9	2909	·544	−13·638	− 6·7
9	18·320	188·3	2604	·612	−11·602	− 5·7
10	20·355	193·3	2358	·680	− 9·567	− 4·7
11	22·391	197·8	2157	·748	− 7·531	− 3·7
12	24·426	202·0	1986	·816	− 5·496	− 2·7
13	26·462	205·9	1842	·884	− 3·460	− 1·7
14	28·497	209·6	1720	·952	− 1·425	− 0·7
14·706	29·922	212·0	1642	1·000	∓ 0·000	∓ 0·0
15	30·533	213·1	1610	1·020	0·611	0·3
16	32·568	216·3	1515	1·088	2·646	1·3
17	34·604	219·6	1431	1·156	4·682	2·3
18	36·639	222·4	1357	1·224	6·717	3·3
19	38·675	225·3	1290	1·292	8·753	4·3
20	40·710	228·0	1229	1·360	10·788	5·3
21	42·746	230·6	1174	1·428	12·842	6·3
22	44·781	233·1	1123	1·496	14·859	7·3
23	46·817	235·5	1075	1·564	16·895	8·3
24	48·852	237·8	1036	1·632	18·930	9·3
25	50·888	240·1	996	1·700	20·966	10·3
30	61·065	250·4	838	2·040	31·143	15·3
35	71·243	259·3	726	2·380	41·321	20·3
40	81·420	267·3	640	2·720	51·498	25·3
45	91·598	274·4	572	3·060	61·676	30·3
50	101·776	281·0	518	3·400	71·854	35·3

TABLE OF THE PROPERTIES OF SATURATED STEAM—*continued.*

Atmosphere included.		Temperature of Steam. F.	Specific Vol.	No. of Atmospheres.	Atmosphere excluded.	
Lbs. per Sq. n.	Inches of Mercury.				Inches of Mercury.	Lbs. per Sq. Inch.
55	111·953	287·1	474	3·740	82·031	40·3
60	122·131	292·7	437	4·080	92·209	45·3
65	132·308	298·0	405	4·420	102·386	50·3
70	142·486	302·9	378	4·760	112·563	55·3
75	152·663	307·5	353	5·100	122·741	60·3
80	162·841	312·0	333	5·440	132·919	65·3
85	173·018	316 1	314	5·780	143·096	70·3
90	183·196	320·2	298	6·120	153·274	75·3
95	193·373	324·1	283	6·460	163·451	80·3
100	203·551	327·9	270	6·800	173·629	85·3
110	223·906	334·6	247	7·480	193·984	95·3
120	244·261	341·1	227	8·160	214·339	105·3
130	264·616	347·2	211	8·840	234·694	115·3
140	284·971	352·9	197	9·520	255·049	125·3
150	305·327	358·3	184	10·200	275·405	135·3
160	325·682	363·4	174	10·880	295·760	145·3
170	346·037	368·2	164	11·560	316·115	155·3
180	366·392	372·9	155	12·240	336·470	165·3
190	386·747	377·5	148	12·920	356·825	175·3
200	407·102	381·7	141	13·600	377·180	185·3
250	508·878	401·1	114	17·000	478·956	235·3
300	610·653	417·5	96	20·400	580·731	285·3
350	712·429	430·1	83	23·800	682·507	335·3
400	814·204	444·9	73	27·200	784·282	385·3
450	915·980	456·7	66	30·600	886·058	435·3
500	1017·755	467·5	59	34·000	987·833	485·3
600	1221·306	487·0	50	40·800	1191·384	585·3
700	1424·857	504·1	43	47·600	1394·935	685·3
800	1628·408	519·5	38	54·400	1598·486	785·3
900	1831·959	533·6	34	61·200	1802·037	885·3
1000	2035·510	546·5	31	68·000	2005·588	985·3

TABLE OF BOILING POINTS, SPECIFIC GRAVITY, OBSERVED VAPOUR DENSITY, AND SOLUBILITY OF VARIOUS LIQUIDS.

Name.		Boiling Point, °C.	Specific Gravity, Water=1.	Vapour Density.	Solubility.	
					Water.	Other Solvents.
$C_6H_{14}O_2$	Acetal	105°	·821	4·141	1 in 18	Ether, alcohol.
C_2H_5NO	Acetamide	221	—	—	Soluble	Alcohol, ether.
$C_2H_4O_2$	Acetic acid, liquid ..	119	1·063	2·00	,,	Alcohol.
$C_4H_6O_3$	Acetic anhydride ..	137·5	1·073	3·47	,,	
C_5H_8O	Acetate of allyl ..	98–100	—	—	Nearly insoluble	Alcohol, ether.
$C_7H_{14}O_2$	,, of amyl ..	133·3	·857	4·458	Insoluble	,, ,,
$C_9H_{10}O_2$	,, of benzyl ..	210	—	—	,,	Alcohol.
$C_4H_8O_2$	,, of ethyl ..	74·3	·910	3·06	Soluble	Alcohol, ether.
$C_3H_6O_2$	,, of methyl ..	56·3	·956	2·563	,,	,, ,,
$C_5H_{10}O_4$	Acetin	—	1·20	—	,,	Ether.
$C_7H_{12}O_5$	Diacetin	280	1·85	—	,,	Ether, benzol.
$C_9H_{14}O_6$	Triacetin	—	1·174	—	Insoluble	Alcohol.
C_3H_6O	Acetone	56	·792	2·0025	Soluble	Alcohol, ether
C_3H_4O	Acrolein	52·4	—	1·897	1 in 40	Ether.
$C_3H_4O_2$	Acrylic acid	—	—	—	Soluble	
C_2H_6O	Alcohol	78·4	·8095	1·613	,,	,,
C_2H_4O	Aldehyde..	20·8	·8000	1·532	,,	Alcohol, ether.
C_3H_5	Allyl	59	·684	2·92	—	

TABLE OF BOILING POINTS, &c.—*continued.*

Name.		Boiling Point, °C.	Specific Gravity, Water=1.	Vapour Density.	Solubility.	
					Water.	Other Solvents.
C_3H_6O	Allyl alcohol	103	—	—	Soluble	Alcohol, ether.
C_3H_5Br	„ bromide, mono-	62	1·47	—	—	Alcohol.
$C_3H_5Br_3$	„ bromide, tri- ..	217	2·432	—	Insoluble	
C_3H_5I	„ iodide	101	1·789	—	„	Alcohol, ether.
$C_6H_{10}O$	„ oxide	82–87	—	—	Nearly insoluble	
$C_6H_{10}S$	„ sulphide	140	—	—	Soluble	„ „
C_3H_6S	Allyl-mercaptan ..	90	—	—	—	
C_3H_4	Allylene	84·4	1·170	—	Insoluble	
C_5H_{11}	Amyl	155–159	·77	—	„	Alcohol.
C_5H_{12}	„ hydride.. ..	30	·638	2·382	„	Alcohol, ether.
$C_5H_{11}I$	„ iodide	146	1·51	6·675	Nearly insoluble	„ „
$C_{10}H_{22}O$	„ oxide	180	—	—	Insoluble	Concentrated H_2SO_4.
$C_5H_{12}S$	„ mercaptan ..	120	·845	3·63	„	Alcohol, ether.
$C_5H_{13}N$	Amylamine	94	·75	—	Soluble	
$C_{10}H_{23}N$	Diamylamine	170	—	—	Nearly insoluble	Acids.
$C_{15}H_{33}N$	Triamylamine ..	257	—	—	„	„

TABLE OF BOILING POINTS, &c.—*continued.*

Name.		Boiling Point, °C.	Specific Gravity, Water=1.	Vapour Density.	Solubility.	
					Water.	Other Solvents.
C_5H_{10}	Amylene	35	—	2·42	Insoluble	Fuming sulphuric acid, bromine.
$C_5H_{12}O_2$	„ hydrate ..	177	·987	—	Soluble	Alcohol, ether.
$C_5H_{10}O$	„ oxide ..	95	·824	2·982	Insoluble	„ „
C_7H_8O	Anisol	152	·991	—	„	Alcohol, ether, fuming sulphuric acid.
$C_8H_8O_2$	Anisyl hydride ..	255	1·09	—	„	Alcohol, ether.
	Antimonides.	—	—	—	—	
SbC_6H_{15}	Stibethyl	158·5	1·324	7·44	Insoluble	„ „
$SbC_6H_{15}Cl_2$	„ chlor. ..	—	—	—	„	„ „
$SbC_6H_{15}Br_2$	„ bromide ..	—	1·953	—	„	„ „
$AsBr_3$	Arsenic bromide ..	22	—	—	—	
$AsCl_3$	„ chloride ..	132	—	6·3006	Soluble in large quantity of water	Alcohol, oil of turpentine. Olive oil, ether.
$As(C_2H_5)_3$	Arsentriethyl	140	1·51	5·278	Insoluble	Absolute alcohol, spirit, ether.

TABLE OF BOILING POINTS, &c.—*continued.*

Name.		Boiling Point, °C.	Specific Gravity, Water=1.	Vapour Density.	Solubility.	
					Water.	Other Solvents.
$As(CH_3)$	Arsenmethyl	133	—	—	—	
$As(CH_3)_2$	Arsendimethyl (cacodyl).	170	—	7·101	Soluble	Alcohol, ether, chloride of ethyl.
$As(CH_3)_2CN$	Cacodyl cyanide ..	140	—	4·63	„	Alcohol, ether.
$As_2C_4H_{12}O$	„ oxide	120	—	—	„	Alcohol.
$As_2C_4H_{12}S$	„ sulphide	above 100	—	7·72	Nearly insoluble	Alcohol, ether.
C_6H_6	Benzol	80·4	·85	2·77	Insoluble	Alcohol, ether, acetone.
C_6H_5Br	Bromobenzine.. ..	150	—	5·631	„	Concentrated sulphuric acid.
$C_6H_4Br_2$	Dibromobenzine ..	219	—	—	„	Ether.
$C_6H_5NO_2$	Nitrobenzine	213–220	1·186	4·4	„	Alcohol, ether.
$C_7H_6O_2$	Benzoic acid	249·2	—	4·27	Soluble	Alcohol, ether, oils.
$C_8H_8O_2$	Benzoate of methyl	198·5	1·10	4·714	Nearly insoluble	Alcohol, ether.
$C_9H_{10}O_2$	„ ethyl ..	212·9	1·055	5·406	Slightly soluble	„ „

TABLE OF BOILING POINTS, &c.—*continued.*

	Name.	Boiling Point, °C.	Specific Gravity, Water=1.	Vapour Density.	Solubility. Water.	Solubility. Other Solvents.
$C_{16}H_{14}O_4$	Benzoate of ethylene	—	—	—	—	Ether.
$C_{12}H_{16}O_2$	” amyl ..	260·7	·9925	—	Insoluble	
$C_{10}H_{10}O_2$	” allyl ..	230–240	—	—	”	Alcohol, ether.
$C_{14}H_{12}O_2$	” benzyl..	345	—	—	—	Ether.
$C_{13}H_{10}O_2$	” phenyl	—	—	—	Insoluble	Alcohol, ether.
$C_7H_5BrO_2$	Bromo-benzoic acid .	—	—	—	Sparingly soluble	” ”
$C_7H_5ClO_2$	Chlorobenzoic acid ..	—	—	—	Insoluble in cold	” ”
$C_7H_5NO_4$	Nitrobenzoic acid ..	—	—	—	Soluble	” ”
$C_9H_9NO_4$	Nitrobenzoate of ethyl.	298	—	—	Insoluble	” ”
$C_{14}H_{10}O_8$	Benzoic anhydride ..	310	—	—	”	” ”
$C_{10}H_{12}O_4$	Benzoate of glycyl ..	320	1·228	—	”	Alcohol, ether, benzine.
$C_{14}H_{12}O_2$	Benzoin	—	—	—	”	Alcohol.
$C_{13}H_{10}O$	Benzone	315	—	—	”	Alcohol, ether.
C_7H_5N	Benzonitrile	190·6	1·196	3·7	Soluble	” ”
C_7H_5OCl	Chloride of benzoyl	196	1·0230	4·987	Insoluble	CS_2
C_8H_5NO	Cyanide of benzoyl	206–208	—	—	”	

TABLE OF BOILING POINTS, &c.—*continued.*

Name.		Boiling Point, °C.	Specific Gravity, Water=1.	Vapour Density.	Solubility.	
					Water.	Other Solvents.
C_7H_6O	Hydride of benzoyl	179·1	1·0499	—	Soluble	Alcohol, ether.
C_7H_7Cl	Chloride of benzyl ..	170–176	1·117	—	Insoluble	,, ,,
C_7H_8	Hydride of benzyl ..	103·7–114	·87	3·27	,,	,, ,,
C_7H_9N	Benzylamine	198	—	—	Sparingly soluble	Alcohol, ether, acetone, CS_2.
$C_7H_6Cl_2$	Chloride of benzylene	206–208	—	5·595	Insoluble	Alcohol, ether.
C_7H_8O	Benzylic alcohol ..	206·5	1·051	3·85	,,	Alcohol, ether, CS_2.
$C_{14}H_{14}O$	,, ether ..	300–315	—	—	,,	
BBr_3	Bromide of boron ..	90	2·69	8·78	—	
BCl_3	Chloride of boron ..	17	1·35	4·06–4·08	—	
$(C_5H_{11})_3BO_3$	Borate of amyl ..	270–275	·87	10·55	—	
$C_2H_2BrO_2$	Bromacetic acid ..	208	—	—	Soluble	
$C_3H_5BrO_2$	Bromacetate of methyl.	144	—	—	Insoluble	
$C_4H_7BrO_2$	Bromacetate of ethyl	159	—	—	—	
$C_2H_2Br_2O_2$	Dibromacetic acid ..	225–230	2·25	—	Soluble	Alcohol, ether.
$C_3H_7Br_4O_2$	Mono-bromhydrin ..	—	—	—	—	Ether.
$C_3H_6Br_2O$	Di ,, ..	219	2·11	—	Insoluble	Ether, absolute alcohol.

TABLE OF BOILING POINTS, &c.—*continued.*

Name.		Boiling Point, °C.	Specific Gravity, Water=1.	Vapour Density.	Solubility.	
					Water.	Other Solvents.
$C_3H_5Br_3$	Tribromhydrin ..	175–180	—	—	—	
Br_2	Bromine	45–63	3·1872	5·54	Soluble	Alcohol, ether.
$CHBr_3$	Bromoform	—	2·13	—	Nearly insoluble	„ „
C_4H_8O	Butyraldehyde ..	68–75	·80	—	—	
$C_4H_8O_2$	Butyric acid	157	·9886	3·7	Soluble	Alcohol
$C_4H_6Br_2O_2$	Dibromo-butyric acid	—	—	—	Slightly soluble	Alcohol, ether.
$C_4H_6Cl_2O_2$	Dichloro-butyric acid	—	—	—	Insoluble	Alcohol.
$C_8H_{14}O_3$	Butyric anhydride ..	190	·978	5·38	„	
$C_7H_{12}O_2$	Butyrate of allyl ..	140	—	—	—	Ether.
$C_9H_{18}O_2$	„ amyl ..	17·6	·852	—	—	
$C_6H_{12}O_2$	„ ethyl ..	119	·90193	4·04	Sparingly soluble	Alcohol, ether.
$C_{10}H_{18}O_4$	„ ethylene	239–241	1·024	—	—	Ether.
$C_5H_{10}O_2$	„ methyl..	102	1·0293	3·52	Insoluble	Alcohol, ether.
$C_7H_{14}O_4$	Monobutyrin	—	—	—	Sparingly soluble	Ether.
$C_{11}H_{20}O_5$	Dibutyrin..	320	1·081	—	Insoluble	Alcohol, ether
$C_7H_{14}O$	Butyrone	144	·83	4·0	„	Alcohol.

TABLE OF BOILING POINTS, &c.—*continued.*

	Name.	Boiling Point, °C.	Specific Gravity, Water=1.	Vapour Density.	Solubility. Water.	Solubility. Other Solvents.
C_4H_7OCl	Chloride of butyryl	95	—	—	—	
C_4H_7OI	Iodide of butyryl ..	146–148	—	—	—	
$C_{10}H_{16}$	Cajputene	160–165	—	—	—	Ether, oil of turpentine.
	,, iso-	176–178	·857	4·5	—	
$C_{20}H_{32}$	,, para- ..	310–316	—	7·96	—	
$C_{10}H_{18}$ or C_9H_{16}	Camphin	167–170	·827	—	Insoluble	Strong alcohol, rock oil, ether, oil of turpentine.
$C_{10}H_{16}$	Caoutchin	175·5	·8423	{4·461 / 4·65}	1 in 2000	Alcohol, ether.
$C_6H_{12}O_2$	Caproic acid	198	·931	—	Sparingly soluble	Alcohol.
$C_8H_{16}O_2$	Caproate of ethyl ..	162	·882	4·97	Insoluble	
$C_{11}H_{22}O$	Caprone	165	—	—	,,	Alcohol, ether.
$C_8H_{16}O_2$	Caprylic acid	236–238	·911	5·31	,,	,, ,,
$C_8H_{16}O$	Caprylic aldehyde ..	171	·818	—	,,	
$C_{16}H_{30}O_3$	Caprylic anhydride	280	—	—	—	Ether.
$C_{10}H_{20}O_2$	Caprylate of ethyl ..	214	·8738	6·1	Insoluble	Alcohol, ether.

TABLE OF BOILING POINTS, &c.—*continued.*

Name.		Boiling Point, °C.	Specific Gravity, Water=1.	Vapour Density.	Solubility. Water.	Solubility. Other Solvents.
	Caprylone	178	—	—	Insoluble	Alcohol, ether, oils.
$C_2H_5N_2O$	Carbamate of methyl	177	—	2·62	Soluble	Alcohol, ether.
$C_3H_7NO_2$	„ ethyl ..	180	—	3·14	„	Alcohol, ether, spirit.
$C_5H_{11}NO_2$	Ethyl-carbamate of ethyl	174–175	·9862	4·071	—	Concentrated sulphuric acid.
CCl_4	Carbonic chloride ..	77	1·56	5·24–5·33	Insoluble	Alcohol, ether.
C_2Cl_6	Carbonic sesqui-chloride	182	2·0 (solid)	8·157	Sparingly soluble	„ „
C_2Cl_4	Carbonic proto-chloride.	{122 {116·7	1·619	5·82	Insoluble	Alcohol, ether, oils.
CS_2	Carbonic disulphide	46·6	1·293	2·67	„	Alcohol, oils, ether.
$CSCl_2$	Carbonic sulpho-chloride.	70	1·46	—	„	
$C_{11}H_{22}O_3$	Carbonate of amyl ..	224–225	·914	—	„	
$C_5H_{10}O_3$	Carbonate of ethyl ..	125	·975	4·09–4·24	„	Alcohol, ether.
$C_{16}H_{33}Cl$	Chloride of cetyl ..	200	·8412	—	„	Ether.
$(C_{16}H_{33})_2O$	Cetyl oxide	300	—	—	—	Alcohol, ether.

TABLE OF BOILING POINTS, &c.—*continued.*

Name.		Boiling Point, °C.	Specific Gravity, Water=1.	Vapour Density.	Solubility.	
					Water.	Other Solvents.
C_9H_7N	Chinoline	238	1·081	4·519	Sparingly soluble	Alcohol, ether, acetone, CS_2.
C_2H_3ClO	Chloracetic acid ..	185–187·8	1·366	—	Soluble	
$C_2HCl_3O_2$	Trichloracetic acid ..	195–200	1·617	5·3	,,	
C_2HCl_3O	Chloral	94·4–98·6	1·502	5·13	,,	Alcohol, ether.
C_2Cl_3OCl	Chloraldehyde.. ..	118	1·603	6·32	,,	
$C_5H_2Cl_6O_3$	Chloralide	—	—	—	Insoluble	Alcohol (hot), ether.
$C_3H_7ClO_2$	Monochlorhydrin ..	227	1·31	—	Soluble	Ether.
$C_3H_6Cl_2O$	Dichlorhydrin.. ..	178	1·37	—	Insoluble	,,
$C_3H_5Cl_2$	Trichlorhydrin ..	155	—	—	,,	
C_3H_5ClO	Epichlorhydrin ..	120–130	—	—	—	
$C_3H_4Cl_2$	Epidichlorhydrin ..	120	—	—	—	
$C_3H_5Br_2Cl$	Dibromochlorhydrin	200	—	—	—	
$C_3H_5BrCl_2$	Bromodichlorhydrin	176	—	—	—	
$C_{14}H_{11}ClO_2$	Chlorobenzil	270	—	—	Insoluble	Alcohol (cold).
$C_3H_5ClO_2$	Chlorocarbonate of ethyl.	94	1·139	3·832	Insoluble in cold	Alcohol, concentrated sulphuric acid.
$CHCl_3$	Chloroform	61	1·491	4·199	Sparingly soluble	Alcohol, ether.

TABLE OF BOILING POINTS, &c.—*continued.*

	Name.	Boiling Point, °C.	Specific Gravity, Water=1.	Vapour Density.	Solubility. Water.	Solubility. Other Solvents.
CCl_3NO_2	Chloropicrin	120	1·665	—	Sparingly soluble	Alcohol, ether.
$C_{16}H_{14}O_2$	Cinnamein	305	1·098	—	Insoluble	,, ,,
C_8H_8	Cinnamene	145·75	·924	—	Soluble	,, ,,
$C_{11}H_{12}O_2$	Cinnamate of ethyl ..	262	1·3	6·537	Insoluble	,, ,,
$C_{10}H_{10}O_2$	,, methyl	241	1·106	—	—	
$C_{18}H_{16}O_2$	,, cinnyl	180?	—	—	—	
$C_9H_7(NO_2)O_2$	Nitrocinnamic acid..	270 with decom.	—	—	Slightly soluble	Slightly soluble in alcohol.
$C_{10}H_9NO_4$	Nitrocinnamate of methyl.	200	—	—	—	Alcohol, ether
C_9H_7OCl	Chloride of cinnamyl	262	1·207	—	—	
$C_{10}H_{16}$	Citrene	165	·8569	4·73	Insoluble	Ether, fatty oils.
$\left.\begin{matrix}(C_6H_5O_4)\\(C_2H_5)_3\end{matrix}\right\}O_3$	Citrate of ethyl ..	280	1·142	—	Sparingly soluble	Alcohol, ether.
$C_8H_{15}N$	Conine	168–212	—	—	,,	Alcohol, ether, oils, acetone.
$C_8H_{10}O_2$	Creosol	218	1·0894	4·98	,,	Alcohol, ether.
C_7H_8O	Cresylic alcohol ..	203	—	—	,,	,, ,,
C_4H_6	Crotonylene	18	—	1·936	—	
$C_{15}H_{24}$	Cubebs, oil of	250–260	·929	—	—	Alcohol.

TABLE OF BOILING POINTS, &c.—*continued.*

	Name.	Boiling Point, °C.	Specific Gravity, Water=1.	Vapour Density.	Solubility.	
					Water.	Other Solvents.
C_9H_{12}	Cumene	144	·87	40–4·3	Insoluble	Alcohol, ether.
$C_9H_{13}N$	Cumenylamine ..	225	·9526	—	Sparingly soluble	Alcohol, ether, CS_2.
$C_{10}H_{12}O_2$	Cuminic acid	250	—	—	Insoluble	Alcohol, ether.
$C_{12}H_{16}O_2$	Cuminate of ethyl ..	240	—	6·65	"	Alcohol.
$C_{10}H_{11}N$	Cumonitrile	239	·765	—	Slightly soluble	Alcohol, ether.
$C_{10}H_{11}O$	Cumyl	300	—	—	—	Hot alcohol.
$C_{10}H_{12}O$	Hydride of cumyl ..	220–236	·9727	5·24	Insoluble	Alcohol.
$C_{10}H_{11}OCl$	Chloride of cumyl ..	256–258	1·070	—	—	
$C_{10}H_{12}Cl_2$	Cumylene chloride	255–260	—	—	Insoluble	Alcohol, ether.
C_4H_5NO	Cyanate of allyl ..	82	—	3·045	Soluble with decom.	Ammonia-water.
C_3H_5NO	" ethyl ..	60	·8989	2·475	"	
C_2H_3NO	" methyl ..	90	—	—	"	
C_7H_5NO	" phenyl ..	178–180	—	—	"	Alcohol, wood-spirit, fusel-oil, carbolic acid.
C_4H_5N	Cyanide of allyl ..	95–106	·794	—	Soluble	Alcohol, ether.

TABLE OF BOILING POINTS, &c.—*continued.*

	Name.	Boiling Point, °C.	Specific Gravity, Water=1.	Vapour Density.	Solubility. Water.	Solubility. Other Solvents.
$C_6H_{11}N$	Cyanide of amyl ..	146	·8061	3·335	Soluble	Alcohol.
C_3H_5N	„ ethyl ..	82	·78	—	„	Alcohol, ether.
$C_4H_4N_2$	„ ethylene	—	—	—	„	„ „
HCN	„ hydrogen	26·5	·7058	·947	„	Alcohol.
C_2H_3N	„ methyl ..	77	—	1·45	„	
C_5H_9N	„ butyl ..	125–128	·81	2·892	„	Alcohol, ether.
$C_3H_3NO_2$	Acetate of cyanogen	80–85	—	—	—	
CNBr	Bromide of cyanogen	—	—	3·607	Soluble	
$C_2H_2Cl_2$	Chloride of cyanogen (liquid).	15·5	—	—	Insoluble	„ „
$C_9N_3H_{15}O_3$	Cyanurate of ethyl..	235	—	7·4	Slightly soluble	„ „
$C_3N_3H_9O_3$	„ methyl	274	—	5·98	Insoluble	Alcohol.
$C_{10}H_{14}$	Cymene	171·5	·857	4·59–470	„	Alcohol, ether, oils.
$C_{10}H_{15}N$	Cymylamine	250	—	—	Slightly soluble	Alcohol, ether.
$C_{10}H_{14}O$	Cymylic alcohol ..	243	—	—	Insoluble	„ „
$C_{12}H_{18}$	Cynene	173–175	·825	—	„	Ether.
	Delphin	258	·954	—	„	Alcohol.

TABLE OF BOILING POINTS, &c.—*continued.*

Name.		Boiling Point, °C.	Specific Gravity, Water=1.	Vapour Density.	Solubility. Water.	Solubility. Other Solvents.
	Etherin	260	—	—	Insoluble	Alcohol, ether.
	Etherol	280	·921	—	,,	,, ,,
C_2H_5, C_5H_{11}	Ethyl-amyl	88	·7069	3·522	—	
C_2H_5, C_4H_9	Ethyl-tetryl	62	·7011	3·053	—	
$C_6H_{15}B$	Boride of ethyl ..	95	·6961	3·4006	Insoluble	
C_2H_5Br	Bromide of ethyl ..	40·7	1·47	3·754	Sparingly soluble	,, ,,
C_2H_5Cl	Chloride of ethyl ..	11	·920	2·219	,,	,, ,,
C_3H_5N	Cyanide of ethyl ..	104–107	1·431	4·26	Insoluble	,, ,,
C_2H_5I	Iodide of ethyl ..	70–72·2	1·946	5·475	Sparingly soluble	,, ,,
$(C_2H_5)_2O$	Oxide of ethyl (ether)	35·6	·723	2·586	,,	Alcohol, chloroform, acetone.
$\left.\begin{matrix}C_2H_5\\CH_3\end{matrix}\right\}O$	Ethylate of methyl	11	—	2·158	Slightly soluble	
$(C_2H_5)_2S$	Sulphide of ethyl ..	73	·825	3·00	Insoluble	Alcohol, ether.
$(C_2H_5)S$	Disulphide of ethyl	151	—	4·270	,,	,, ,,
C_2H_6S	Sulphydrate of ethyl	61–63	·832	2·11	Sparingly soluble	,, ,,

TABLE OF BOILING POINTS, &c.—*continued.*

Name.		Boiling Point, °C.	Specific Gravity, Water=1.	Vapour Density.	Solubility.	
					Water.	Other Solvents.
$C_7H_{16}S$	Sulphethylate of amyl.	132–133·5	—	4·49	Insoluble	Alcohol.
C_3H_8S	Sulphethylate of methyl.	58·8	—	2·609	Sparingly soluble	
$C_4H_{10}Te$	Telluride of ethyl ..	below 100	—	—	Slightly soluble	,,
C_4H_9NO	Ethylacetamide ..	200	—	—	Soluble	,,
C_2H_7N	Ethylamine	18·7	·696	1·576	,,	,,
$C_4H_{11}N$	Diethylamine	57	—	—	,,	
$C_6H_{15}N$	Triethylamine ..	—	—	—	Sparingly soluble	
$C_9H_{21}N$	Diethylamylamine..	154	—	—	,,	
$C_4H_8O_3$	Monacetate of ethylene.	182	—	—	Soluble	,,
$C_6H_{10}O_4$	Diacetate of ethylene	186–187	1·128	4·744	,,	Alcohol, ether.
$C_2H_4Br_2$	Bromide of ethylene	129	2·16	6·845	Insoluble	,, ,,
$C_{10}H_{18}O_4$	Butyrate of ethylene	240	1·024	—	,,	,, ,,
$C_6H_{11}ClO_2$	Butyroxychloride of ethylene.	190	1·085	—	,,	Alcohol.
$C_2H_4Cl_2$	Chloride of ethylene	82·5–85	1·25	—	Nearly insoluble	Alcohol, ether.

TABLE OF BOILING POINTS, &c.—*continued.*

Name.		Boiling Point, °C.	Specific Gravity, Water=1.	Vapour Density.	Solubility.	
					Water.	Other Solvents.
$C_2H_3Cl_3$	Chloride of chlor-ethylene.	115	1·42	4·72–4·67	Insoluble	Alcohol, ether.
$C_2H_2Cl_2$	Dichlorethylene ..	35–40	1·25	3·321	"	" "
$C_2H_2Cl_4$	Chloride of dichlor-ethylene.	135	1·576	5·796	"	" "
C_2HCl_5	Chloride of trichlor-ethylene.	153·8	1·662	7·087	"	
C_2H_4ClI	Chloriodide of ethylene	145–147	2·151	—	Slightly soluble	" "
$C_6H_{14}O_2$	Diethylate of ethylene.	123·5	·799	4·095	—	
$C_2H_6O_2$	Ethylenic alcohol (glycol).	197·5	1·125	—	Soluble	Alcohol.
$C_4H_{10}O_3$	Diethylenic alcohol ..	245	—	3·78	"	Alcohol, ether.
$C_6H_{14}O_4$	Triethylenic alcohol	290	—	—	—	
$C_8H_{18}O_5$	Tetrethylenic alcohol	above 300	—	—	—	
C_2H_5ClO	Hydroxychloride of ethylene.	128	—	—	Soluble	
$C_2H_4I_2$	Iodide of ethylene ..	—	—	—	Insoluble	" "

TABLE OF BOILING POINTS, &c.—*continued.*

	Name.	Boiling Point, °C.	Specific Gravity, Water=1.	Vapour Density.	Solubility.	
					Water.	Other Solvents.
C_2H_4ClI	Iodo chloride of ethylene.	147	—	—	Slightly soluble	
C_2H_4O	Oxide of ethylene ..	13·5	—	1·422	Soluble	Alcohol.
$C_4H_8O_2Br_2$	Oxybromide of ethylene.	95	—	—	Insoluble	Alcohol, ether.
$C_{10}H_{12}O_2$	Eugenic acid	242	—	6·4	Sparingly soluble	Alcohol, ether, alkalies.
	Eupione	47	·65	—	Insoluble	Alcohol, ether.
CH_2O_2	Formic acid	{98·5 / 105·3}	1·2352	{2·12 / 2·14}	Soluble	Alcohol.
$C_6H_{12}O_2$	Formate of amyl ..	116	·8809	—	Slightly soluble	
$C_3H_6O_2$	" ethyl ..	54	·9184	2·593	Soluble	Ether, alcohol.
$C_2H_4O_2$	" methyl ..	36–38	—	2·08	Insoluble	
$C_4H_2O_3$	Fumaric anhydride..	176	—	—	—	
$C_4H_2O_2Cl_2$	Chloride of fumaryl	160	—	—	—	
$C_5H_4O_2$	Furfurol	162·8–166	1·1648	3·334	Soluble	Alcohol.
C_5H_6S	Disulphide of fusyl	112	·880	—	Insoluble	Alcohol, ether.

TABLE OF BOILING POINTS, &c.—*continued.*

	Name.	Boiling Point, °C.	Specific Gravity, Water=1.	Vapour Density.	Solubility.	
					Water.	Other Solvents.
	Glycerides.					
$C_5H_{12}O_3$	Ethylin	225–230	—	—	Soluble	
$C_5H_{11}ClO_2$	Ethylchlorhydrin ..	180	—	—	Insoluble	
$C_8H_{18}O_3$	Amylin	260–262	·98	—	Soluble	Ether.
$C_8H_{17}ClO_2$	Amylchlorhydrin ..	235	1·0	—	Insoluble	
$C_{13}H_{28}O_3$	Diamylin	272–274	—	—	„	
$C_{10}H_{22}O_3$	Ethylamylin	238–240	—	—	„	
$C_8H_{16}O_2$	Amylglycide	188	—	—	„	
$C_5H_{10}O_2$	Ethylglycide	128–129	—	—	Soluble	
C_3H_5BrO	Epibromhydrin ..	138–140	—	—	„	„
C_3H_5ClO	Epichlorhydrin ..	118–119	—	3·21	Insoluble	Alcohol, ether.
$C_4H_8O_3$	Ethyl-glycollic acid	200	—	—	—	
$C_9H_{18}O_3$	Ethyl-glycollate of amyl.	180–190	—	—	—	„ „
$C_6H_{10}O_4$	Acetoglycollate of ethyl.	179	1·009	—	—	
$C_7H_{14}O_3$	Amyl-glycollic acid	235	1·003	—	Sparingly soluble.	„ „
$C_9H_{18}O_3$	Amyl-glycollate of ethyl	212	—	—		

TABLE OF BOILING POINTS, &c.—*continued.*

	Name.	Boiling Point, °C.	Specific Gravity, Water=1.	Vapour Density.	Solubility. Water.	Solubility. Other Solvents.
	Guaicol	205–210	1·125	—	Sparingly soluble	Alcohol, ether.
$C_9H_{18}O_2$	Acetate of heptyl ..	180	—	—	—	
$C_7H_{15}Cl$	Chloride " ..	α 150 β 175	·891	—	—	
$C_7H_{14}Cl_2$	Monochlorinated chloride of heptyl	190	—	—	—	
$C_7H_{16}O$	Heptyl alcohol ..	155–179	·819	4·019	Insoluble	" "
C_7H_{16}	Hydride of heptyl ..	92–99	·712	3·49	—	
$C_7H_{15}I$	Iodide " ..	190	—	—	—	
$C_7H_{16}S$	Sulphydrate " ..	155–158	—	—	—	
$C_7H_{17}N$	Heptylamine	145–147	—	—	Soluble	
$C_{12}H_{26}O$	Heptylamylic ether	220–221	·608	6·57	—	
C_7H_{14}	Heptylene	95–99	·718	3·320	—	Alcohol.
$C_7H_{14}Cl_2$	Chloride of heptylene	191	—	—	—	
$C_7H_{13}Cl$	Chlorheptylene ..	155	—	—	—	
$C_7H_{15}I$	Hydriodate of heptylene.	170	—	—	—	
$C_9H_{20}O$	Heptyl-ethylic ether	177	·791	5·095	Insoluble	Alcohol, ether.
$C_8H_{18}O$	Heptyl-methylic ether	161	·830	4·2	"	" "
$C_{12}H_{26}$	Hexyl	202	·754	5·983	"	" "

TABLE OF BOILING POINTS, &c.—*continued.*

Name.		Boiling Point, °C.	Specific Gravity, Water=1.	Vapour Density.	Solubility.	
					Water.	Other Solvents.
$\left.\begin{matrix}C_2H_3O\\C_6H_{13}\end{matrix}\right\}$	Acetate of hexyl					
	α	145	—	—	—	
	β	156	·877	—	Insoluble	
$C_6H_{14}O$	Hexyl alcohol					
	α	150	—	—	„	
	β	137	·8327	—	—	
$C_6H_{12}O$	β Hexyl aldehyde (?)	127	·829	—	Sparingly soluble	
$C_6H_{13}Cl$	β Chloride of hexyl	120	—	—	—	
C_6H_{14}	Hydride of hexyl					
	α	68	·678	—	—	
	β	—	·6645	—	—	
$C_6H_{13}I$	Iodide of hexyl					
	α	172–175	—	—	—	
	β	167·5	1·447	—	—	
$\left.\begin{matrix}C_6H_{13}\\C_6H_{13}\end{matrix}\right\}O$	β Hexyl oxide ..	203–208	—	—	—	
C_9H_{12}	Hexylene					
	α	71	—	—	—	
	β	68–70	—	—	Insoluble	

TABLE OF BOILING POINTS, &c.—*continued.*

	Name.	Boiling Point, °C.	Specific Gravity, Water=1.	Vapour Density.	Solubility.	
					Water.	Other Solvents.
$C_5H_{11}NO_2$	Lactethylamide ..	260	—	—	—	Alcohol.
$C_9H_{16}O_4$	Butyrolactate of ethyl	208	—	6·73	—	
$C_5H_{10}O_3$	Lactate of ethyl ..	156	1·042	4·14	Soluble	Alcohol, ether.
$C_5H_{10}O_3$	Ethyl-lactic acid ..	195–198	—	—	"	" "
$C_7H_{14}O_3$	Ethyl - lactate of ethyl.	156·5	·9203	5·052	Insoluble.	" "
$C_8H_{14}O_5$	Dilactate of ethyl ..	235	1·134	—	—	
$C_4H_8O_3$	Lactate of methyl ..	—	—	—	Soluble.	" "
$C_{14}H_{28}O_2$	Laurate of ethyl ..	269	·86	8·4	Insoluble	Ether.
PbC_8H_{20}	Plumbotetrethyl ..	above 200	1·62	—	—	
PbC_4H_{12}	Plumbotetramethyl	160	—	—	Insoluble	Alcohol, ether.
$C_{10}H_9N$	Lepidine	266–271	1·072	5·14	—	
$C_{20}H_{32}N_2$	Diamyline-lepidine	175	—	10·40	—	
$C_8H_6O_3$	Leucate of ethyl ..	175	·9613	5·241	Insoluble	" "
C_7H_9N	Lutidine					
	α	154	—	} 3·839	Soluble	
	β	163–168	—			
$C_4H_4O_4$	Maleic acid	160 with decom.	—	—	"	" "
—	Bromomaleic anhydride.	212	—	—	—	

TABLE OF BOILING POINTS, &c.—*continued.*

Name.		Boiling Point, °C.	Specific Gravity, Water=1.	Vapour Density.	Solubility.	
					Water.	Other Solvents.
$C_{30}H_{60}$	Melene	370–380	·89	10·0–11·8	Insoluble	Alcohol (hot), ether.
$C_{10}H_{18}$	Menthene	163	·851	4·93	,,	Alcohol, ether.
$C_{10}H_{19}$	Menthyl	222–224	—	—	—	
$C_{14}H_{26}O_2$	Butyrate of menthyl	230–240	—	—	—	
$C_{10}H_{19}Cl$	Chloride ,,	204	—	—	Soluble	Alcohol.
Hg	Mercury	346–360	13·55	6·7	Insoluble	
C_9H_{12}	Mesitylene	155–160	—	4·282	,,	
$C_6H_{10}O$	Metacetone	84	—	—	,,	Alcohol, ether.
$Al_2C_6H_{18}$	Methide aluminic ..	130	—	4·4	—	
CH_3Br	Bromide of methyl	13	—	—	Insoluble	,, ,,
CH_4O	Methyl alcohol ..	60–66·5	·8142	—	Soluble	,, ,,
CH_3I	,, iodide of ..	42·2	2·199	4·88	Insoluble	,, ,,
$\left.\begin{matrix}CH_3\\CH_3\end{matrix}\right\}O$	,, oxide	−20	—	—	Soluble	,, ,,
C_2H_6S	,, sulphide ..	41	·845	2·115	Insoluble	Alcohol.
$C_2H_6S_2$	,, disulphide ..	116·118	1·046	—	Sparingly soluble	Alcohol, ether.
CH_4S	,, sulphydrate	21	—	—	Soluble	
C_2H_6Te	,, telluride ..	82	—	—	Insoluble	

TABLE OF BOILING POINTS, &c.—*continued.*

	Name.	Boiling Point, °C.	Specific Gravity, Water=1.	Vapour Density.	Solubility.	
					Water.	Other Solvents.
$C_3H_8O_2$	Methylal	42	·8551	2·625	Soluble	Alcohol, ether.
C_2H_7N	Dimethylamine ..	8–9	—	—	„	
C_3H_9N	Trimethylamine ..	9	—	—	„	Alcohol.
$C_4H_{10}O_2$	Methylate of ethylene.	63–64	·8787	3·165	—	
$C_5H_{10}O$	Methyl-butyral ..	111	·827	3·13	—	
$C_{10}H_{16}O$	Methyl-camphrene	225–230	—	—	Insoluble	
CH_2Cl_2	Chloride of methylene	40	—	—	—	
CH_2I_2	Iodide of methylene	—	3·342	—	Insoluble	„
$C_{10}H_8$	Naphthalene	218	1·153	4·528	„	Alcohol, ether.
$C_{10}H_9N$	Naphthylamine ..	300	—	—	„	„ „
$C_5H_{11}NO_2$	Nitrite of amyl ..	96	·877	—	—	
$C_2H_5NO_2$	„ ethyl ..	18	—	—	Soluble	„ „
CH_3NO_2	„ methyl ..	−12	—	—	—	
$C_4H_{10}N_2O$	Nitrosethylin.. ..	176·8	·951	—	—	
C_9H_{20}	Nonyl, hydride of ..	134–137	—	4·50	—	
$C_9H_{19}Cl$	Chloride of nonyl ..	196	·889	—	—	
$C_9H_{21}N$	Nonylamine	190–192	—	—	Soluble	
C_9H_{18}	Nonylene	110–140	—	4·071 4·54	Insoluble	„ „

TABLE OF BOILING POINTS, &c.—*continued.*

	Name.	Boiling Point, °C.	Specific Gravity, Water=1.	Vapour Density.	Solubility.	
					Water.	Other Solvents.
$C_8H_{17}Cl$	Chloride of octyl ..	168–175	·892	—	Insoluble	Alcohol.
$C_8H_{17}HO$	Octylic alcohol ..	180	·823	4·55	„	Alcohol, ether.
C_8H_{18}	Hydride of octyl ..	119	·728	4·01	—	
$C_8H_{17}I$	Iodide „ ..	193–211	1·31	—	Insoluble	Alcohol.
$C_8H_{19}N$	Octylamine	164–175	·786	—	„	Alcohol, ether.
C_8H_{16}	Octylene	115–125	—	3·86–4·17	„	„ „
$C_{16}H_{32}$	Meta-octylene.. ..	250	·814	—	„	
$C_{12}H_{22}O_4$	Acetate of octylene	240–250	—	—	—	
$C_8H_{18}O_2$	Hydrate „	235–240	·932	—	Insoluble	„ „
$C_8H_{17}ClO$	Hydratochloride of octylene.	204–208	—	—	—	
	Œnanthic ether ..	225–230	·862	9·8	Insoluble	„ „
$C_7H_{14}O$	Œnanthol	151–158	·827	4·08	Sparingly soluble	„ „
$C_7H_{14}O$	Metœnanthol	230	—	—	—	Alcohol (hot).
$C_7H_{14}O_2$	Œnanthylic acid ..	148–218	·9167	—	Insoluble	Alcohol, ether.
$C_{13}H_{26}O$	Œnanthylone	264	·825	—	—	
$C_7H_8O_2$	Orcin	290	—	5·7	Soluble	„ „
$C_6H_6O_2$	Resorcin	271	—	4·1	„	„ „
$C_8H_{10}O_4$	Oxalate of allyl ..	206–207	1·055	—	—	

TABLE OF BOILING POINTS, &c.—*continued.*

Name.		Boiling Point, °C.	Specific Gravity, Water=1.	Vapour Density.	Solubility.	
					Water.	Other Solvents
$C_{12}H_{22}O_4$	Oxalate of amyl ..	262	—	8·4	—	
$C_6H_{10}O_4$	„ ethyl ..	183–184	1·0824	5·087	Sparingly soluble	Alcohol.
$C_5H_8O_4$	Oxalate of ethyl-methyl.	160–170	1·27	4·677	—	
$C_4H_6O_4$	Oxalate of methyl ..	161	—	—	Soluble	Alcohol, ether.
$C_4H_8O_3$	Dimethoxalic acid ..	212	—	—	—	
$C_9H_{18}O_3$	Ethamoxalic acid ..	224–225	·939	6·29	—	
$C_{14}H_{28}O_3$	Diamoxalate of ethyl	262	·9137	8·4	—	
$C_4H_7NO_3$	Oxamate „	220	—	—	Soluble	Alcohol.
$C_6H_{11}NO_3$	Dimethyloxamate of ethyl.	250–260	—	—	—	
$C_{14}H_{12}N_2O_2$	Diphenyloxamide ..	320	—	—	Insoluble	Sparingly soluble in benzine.
C_6H_6	Parabenzene	97·5	—	—	—	
C_6H_6O	Phenol	187–188	—	—	Sparingly soluble	Alcohol, ether.
$C_6H_5NO_3$	Nitrophenic acid ..	216	—	—	„	Benzine, CS_2.
C_6H_5	Phenyl	239–240	—	—	—	Alcohol.

TABLE OF BOILING POINTS, &c.—*continued.*

	Name.	Boiling Point, °C.	Specific Gravity, Water=1.	Vapour Density.	Solubility.	
					Water.	Other Solvents.
C_7H_5N	Cyanide of phenyl..	182·5–187·5	—	—	Sparingly soluble	Alcohol, ether.
C_6H_5Br	Monobromobenzene	152–154	—	—	Insoluble	Strong sulphuric acid.
$C_6H_4Br_2$	Dibromobenzene ..	219	—	—	"	Ether.
C_6H_5Cl	Monochlorobenzene	136	—	—	—	
$C_{12}H_{10}S$	Sulphide of phenyl	292·5	1·09	—	Insoluble	Alcohol, ether, CS_2.
C_6H_6S	Sulphydrate of phenyl	165	1·078	—	"	Alcohol, ether, CS_2.
C_6H_7N	Phenylamine (aniline).	182	1·020	3·210	Slightly soluble	Alcohol, ether, oils, CS_2.
$C_6H_4Br_3N$	Tribromaniline ..	300	—	—	Insoluble	Alcohol, ether.
C_6H_6ClN	Chloraniline	above 200	—	—	Sparingly soluble	" "
$C_6H_6N_2O_2$	Nitraniline					
—	α	285	—	—	Soluble	" "
$C_6H_5N_3O_4$	Dinitraniline	185	—	—	Sparingly soluble	" "
$C_{11}H_{17}N$	Amylaniline	285	—	—	—	Ether, bromide of amyl.

TABLE OF BOILING POINTS, &c.—*continued.*

Name.		Boiling Point, °C.	Specific Gravity, Water=1.	Vapour Density.	Solubility.	
					Water.	Other Solvents.
$C_{16}H_{27}N$	Diamylaniline ..	275–280	—	—	—	
$C_8H_{11}N$	Ethylaniline	204	·954	—	—	Alcohol.
$C_{10}H_{15}N$	Diethylaniline ..	213·5	·936	—	—	"
$C_{11}H_{15}N$	Ethyl-allyl-aniline..	220–225	—	—	—	
$C_{13}H_{21}N$	Ethyl-amyl-aniline	262	—	—	Insoluble	
C_7H_9N	Methylaniline ..	192	—	—	—	
$C_{12}H_{11}N$	Diphenylamine ..	310	—	—	Insoluble	Alcohol, ether.
$C_{18}H_{15}N$	Triphenylamine ..	140–150	—	—	Sparingly soluble	" "
$C_{13}H_{13}N$	Tolylaniline	334·5	—	—	—	
$C_{11}H_6$	Phenyl-amyl	195	·859	—	—	
$C_{13}H_{10}O$	Phenyl-benzoyl ..	315	—	—	Insoluble	" "
$C_{26}H_{22}O$	Benzydrol	297–298	—	—	Sparingly soluble	" "
$C_{15}H_{16}O$	Benzhydrolic ethylate.	183	1·029	—	Insoluble	Alcohol, ether, benzene.
$C_{15}H_{14}O_2$	Benzydrolic acetate	301–302	—	—	—	Alcohol, ether, benzene.
C_8H_{10}	Phenyl-ethyl	133	—	—	—	
C_7H_8	Phenyl-methyl ..	111	·881	—	—	

TABLE OF BOILING POINTS, &c.—*continued.*

Formula	Name.	Boiling Point, °C.	Specific Gravity, Water=1.	Vapour Density.	Solubility. Water.	Solubility. Other Solvents.
$C_8H_{10}O$	Phloretol	190–200	1·0374	4·22	Sparingly soluble	Alcohol, ether.
P_4	Phosphorus	250–290	—	4·35	Insoluble	CS_2, PCl_3
PCl_3	Trichloride of phosphorus.	73·–78·5	1·45–1·61	4·79	—	
PCl_5	Pentachloride of phosphorus.	above 148	—	3·656	—	
$POCl_3$	Oxychloride of phosphorus.	110	1·7	—	—	
$C_3H_{15}PO_4$	Triethylic phosphate	215	1·072	—	Soluble	Alcohol, ether.
$POBr_3$	Oxybromide of phosphorus.	195	2·822	—	—	
$PSCl_3$	Sulphochloride of phosphorus.	124–127	1·631	5·963	—	
$C_6H_{15}P$	Triethyl-phosphine	127·5	·812	—	Insoluble	„ „
$C_6H_{15}PO$	Oxide of triethyl-phosphine.	240	—	4·6	Soluble	Alcohol.
$C_{11}H_{14}O_3$	Photosantonin ..	305	—	—	Insoluble (cold)	Alcohol, ether.
C_6H_7N	Picoline	135	·9613	3·290	Soluble	„ „

TABLE OF BOILING POINTS, &c.—*continued.*

Name.		Boiling Point, °C.	Specific Gravity, Water=1.	Vapour Density.	Solubility.	
					Water.	Other Solvents.
$C_5H_{10}O$	Propione	101	—	—	Insoluble	Alcohol, ether.
$C_3H_6O_2$	Propionic acid ..	140	—	—	Soluble	„ „
$C_3H_5BrO_2$	Bromopropionic acid	205·5	—	—	„	„ „
C_3H_6O	Propionic aldehyde ..	55–65	·79	2·04	„	„ „
$C_5H_9ClO_2$	Ethylic chloropropionate.	150	—	4·9	—	
$C_5H_9IO_2$	Ethylic iodopropionate.	180–200	—	—	Soluble	Alcohol.
$C_3H_3Cl_2N$	Dichloropropionitrile	104–107	—	—	Insoluble	Alcohol, ether.
C_5H_5N	Pyridine	117	·985	2·91	Soluble	Oils.
C_4H_5N	Pyrrol	133	1·077	2·40	Sparingly soluble	Alcohol, ether.
$C_{10}H_{18}$	Rutylene	150	—	4·843	Insoluble	„ „
$C_7H_7NO_2$	Salicylamic acid ..	270	—	—	Soluble	„ „
$C_8H_8O_3$	Methylsalicylic acid	222	1·18	5·42	Sparingly soluble	„ „
$C_9H_{10}O_3$	Methylsalicylate of methyl.	248	—	—	—	
$C_{10}H_{12}O_3$	Methylsalicylate of ethyl.	262	—	—	—	

TABLE OF BOILING POINTS, &c.—*continued.*

	Name.	Boiling Point, °C.	Specific Gravity, Water=1.	Vapour Density.	Solubility.	
					Water.	Other Solvents.
$C_9H_{10}O_3$	Ethylsalicylic acid	221–229	1·097	—	Sparingly soluble	Alcohol, ether.
$C_{12}H_{16}O_3$	Amylsalicylic acid..	270	—	—	Insoluble	
$C_7H_6O_2$	Salicylol	182–196·5	1·173	4·276	Soluble	" "
$C_{12}H_{22}O_4$	Sebate of methyl ..	285	—	—	Insoluble	Alcohol.
$C_{14}H_{26}O_4$	" ethyl ..	308	—	—	"	"
$C_{20}H_{44}SiO_4$	Tetramylic silicate..	322–325	·868	15·2	"	Alcohol, ether.
$C_8H_{20}SiO_4$	Tetrethylic " ..	165–166	·933	7·32	"	
$C_4H_{10}SiO_3$	Diethylic " ..	350	1·079	—	—	
$C_{12}H_{30}Si_2O_7$	Hexethylic disilicate	about 240	1·012	12·025	—	
$C_6H_{15}ClSiO_3$	Ethylsilicic monochlorhydrin.	157	1·048	7·05	—	
$C_4H_{10}Cl_2SiO_2$	Ethylsilicic dichlorhydrin.	137	1·44	6·76	—	
$C_2H_5Cl_3SiO$	Ethylsilicic trichlorhydrin.	104	1·291	6·378	—	
$C_{11}H_{26}SiO_4$	Triethylamylic silicate.	216–225	—	—	—	
$C_{14}H_{32}SiO_4$	Diethyldiamylic silicate.	245–250	·915	—	—	

TABLE OF BOILING POINTS, &c.—*continued.*

Name.		Boiling Point, °C.	Specific Gravity, Water=1.	Vapour Density.	Solubility.	
					Water.	Other Solvents.
$C_{17}H_{38}SiO_4$	Ethytriamylic silicate.	280–285	·913	—	—	
$C_8H_{18}SiO_5$	Tehethyl-acetyl-silicic ether.	190	—	—	—	
$C_5H_{14}SiO_4$	Ethyltrimethyl silicate.	133–135	—	—	—	
$C_6H_{16}SiO_4$	Diethyldimethylic silicate.	143–146	1·004	6·178	—	
$C_7H_{18}SiO_4$	Triethylmethylic silicate.	155–157	·981	—	—	
$C_{12}H_{28}SiO_4$	Dimethyldiamyl silicate.	225–235	—	—	—	
$C_{20}H_{40}O_2$	Stearate of ethyl ..	224 (F.?)	—	—	Insoluble	Alcohol, ether.
$C_{14}H_{12}$	Stilbene	292	—	8·4	—	" "
$C_{12}H_{22}O_4$	Suberate of ethyl ..	230–260	1·003	—	—	" "
$C_4H_4O_2Cl_2$	Succinic chloride ..	190	—	—	—	Ether.
$C_6H_{10}O_4$	Succinate of methyl	198	1·179	5·29	Nearly insoluble	Alcohol, ether.
$C_8H_{14}O_4$	" ethyl ..	214	1·036	6·22	Slightly soluble	

TABLE OF BOILING POINTS, &c.—*continued.*

Name.		Boiling Point, °C.	Specific Gravity, Water=1.	Vapour Density.	Solubility.	
					Water.	Other Solvents.
$C_7H_{10}S_3$	Trisulphocarbonate of allyl.	170–175	·943	—	—	
$C_{11}H_{22}S$	Trisulphocarbonate of amyl.	245–248	·877	—	Insoluble	Alcohol, ether, chloroform, benzol.
$C_5H_{10}O_2S$	Monosulphocarbonate of ethyl.	162	1·032	—	,,	Alcohol, ether.
$C_5H_{10}OS_2$	Disulphocarbonate of ethyl.	200	1·070	—	,,	,, ,,
$C_5H_{10}S_3$	Trisulphocarbonate of ethyl.	237–240	—	—	Sparingly soluble	,, ,,
$C_3H_6OS_2$	Disulphocarbonate of methyl.	170–172	1·143	4·266	Insoluble	,, ,,
$C_3H_6S_3$	Trisulphocarbonate of methyl.	200–205	1·159	4·652	Nearly insoluble	,, ,,
C_4H_5NS	Sulphocyanate of allyl	148	1·009	3·54	Sparingly soluble	,, ,,
$C_6H_{11}NS$	,, amyl	197	·905	—	Insoluble	,, ,,
C_3H_5NS	,, ethyl	146	1·020	3·018	,,	,, ,,

TABLE OF BOILING POINTS, &c.—*continued.*

	Name.	Boiling Point, °C.	Specific Gravity, Water=1.	Vapour Density.	Solubility. Water.	Solubility. Other Solvents.
$C_7H_{13}NS$	Sulphocyanate of hexyl.	215–220	·992	—	—	
C_2H_3NS	Sulphocyanate of methyl.	132–133	1·115	2·57–2·549	Sparingly soluble	Alcohol, ether.
Cl_2S_2	Disulphide of chlorine	136–139	1·687	4·77	—	" ", CS_2
$C_{10}H_{22}SO_3$	Sulphite of amyl ..	230–250	—	—	—	
$C_4H_{10}SO_3$	" ethyl ..	160	1·085	4·78	Insoluble	" "
$C_7H_{16}SO_3$	Sulphite of ethyl and amyl.	210–225	—	—	—	
$C_2H_6SO_3$	Sulphite of methyl..	121·5	1·045	3·703	Sparingly soluble	" "
$C_3H_8SO_3$	Sulphite of methyl and ethyl.	140–141·5	1·067	4·304	—	
$S_2O_5Cl_2$	Chlorosulphuric oxide	145–150	1·762	—	—	
H_2SO_4	Sulphuric acid ..	327	1·842	—	Soluble	
$C_4H_{10}SO_4$	Sulphate of ethyl ..	110–120(?)	1·120	—	Insoluble	Alcohol, ether, fuming nitric acid.
$C_2H_6SO_4$	Sulphate of methyl	188	1·385	—	—	

TABLE OF BOILING POINTS, &c.—*continued.*

	Name.	Boiling Point, °C.	Specific Gravity, Water=1.	Vapour Density.	Solubility.	
					Water.	Other Solvents.
C_4H_9	Tetryl (Butyl) ..	106–108·5	·694	3·88	Insoluble	Alcohol, ether.
C_9H_{20}	Tetryl-amyl	132	·724	4·46	—	
C_6H_{14}	Tetryl-ethyl	62	·701	3·053	—	
$C_{10}H_{22}$	Tetryl-hexyl	155–160	—	4·917	—	
$C_6H_{12}O_2$	Acetate of tetryl ..	114	·844	4·073	—	
$C_4H_{10}O$	Tetryl alcohol, *α* ..	110	·803	2·589	Soluble	,, ,,
$C_4H_{10}O$	Secondary tetryl alcohol.	95–98	·85	—	,,	,, ,,
C_4H_9Br	Bromide of tetryl ..	89	1·274	4·72	Insoluble	
C_4H_9Cl	Chloride ,, ..	70	·88	—	,,	
C_4H_{10}	Hydride ,, ..	—	·60	2·11	,,	,, ,,
C_4H_9I	Iodide ,, *α* ..	121	1·604	6·217	,,	
C_4H_9I	Secondary iodide of tetryl.	118	1·632	6·597	,,	,, ,,
$C_4H_{11}N$	Tetrylamine	69–70	—	—	Soluble	,, ,,
C_4H_8	Tetrylene..	below 0 – 4	—	1·933	,,	,, ,,
$C_8H_{14}O_4$	Acetate of tetrylene	200	—	—	Insoluble	,, ,,
$C_4H_{10}O_2$	Tetrylenic alcohol ..	183–184	—	3·19	Soluble	,, ,,

TABLE OF BOILING POINTS, &c.—*continued.*

Name.		Boiling Point, °C.	Specific Gravity, Water=1.	Vapour Density.	Solubility. Water.	Solubility. Other Solvents.
$C_4H_8Br_2$	Bromide of tetrylene	158	—	—	—	
$C_4H_8Cl_2$	Chloride ,,	123	1·112	4·426	Insoluble	Alcohol, ether.
$C_4H_6O_2S$	Thiacetic anhydride	121	—	—	—	
$SnC_4H_{10}Br_2$	Stannethyl bromide	232	—	11·64	Soluble	,, ,,
$SnC_4H_{10}Cl_2$	,, chloride	220	—	8·62	,,	,, ,,
$SnC_4H_{10}I_2$	,, iodide ..	245	—	—	,,	,, ,,
$SnC_6H_{15}Br$	Stannotriethyl bromid .	223	1·630	9·924	Sparingly soluble	,, ,,
$SnC_6H_{15}Cl$	Stannotriethyl chloride.	209	1·428	8·43	—	,, ,,
$SnC_6H_{15}I$	Stannotriethyl iodide	235–238	1·833	—	Sparingly soluble	,, ,,
SnC_8H_{20}	Stannic ethide.. ..	181	1·87	8·02	,,	,, ,,
$SnC_2H_6Br_2$	Bromide of stannodimethyl.	208–210	—	—	Soluble	Alcohol.
$SnC_2H_6Cl_2$	Chloride of stannodimethyl.	188–190	—	7·73	,,	Alcohol, ether.
SnC_3H_9I	Iodide of stannotrimethyl.	188–190	2·153	10·325	—	

TABLE OF BOILING POINTS, &c.—*continued.*

	Name.	Boiling Point, °C.	Specific Gravity, Water=1.	Vapour Density.	Solubility. Water.	Solubility. Other Solvents.
SnC_4H_{12}	Stannic methide ..	140–145	—	—	—	
SnC_5H_{14}	Stannic ethotri-methide.	123–128	1·243	6·715	Insoluble	
SnC_6H_{16}	Stannic diethodime-thide.	144–146	1·232	6·838	—	
SnC_7H_{18}	Stannic triethomethide	162–163	—	—	—	
$C_{10}H_{16}$	Tolene	154–170	·858	5·1	—	
C_7H_8	Toluol (toluene) ..	110·3	·872	—	Insoluble	Alcohol, ether, oils.
C_7H_7Br	Monobromotoluene	179–183	1·409	—	—	
C_7H_7Br	Benzylic bromide ..	198–202	—	—	—	
C_7H_7Cl	Monochlorotoluene	157–164	1·08	—	—	
$C_7H_6Cl_2$	Chlorobenzylic chloride.	below 200	—	—	—	
$C_7H_6Cl_2$	Chlorobenzol	206	1·295	—	—	
$C_7H_5Cl_3$	Dichlorobenzylic chloride.	240	1·44	—	—	
$C_7H_5Cl_3$	Benzotrichloride ..	215	—	—	Insoluble	
$C_7H_4Cl_4$	Tetrachlorotoluene..	276	—	—	—	

TABLE OF BOILING POINTS, &c.—*continued*.

Name.		Boiling Point, °C.	Specific Gravity, Water=1.	Vapour Density.	Solubility.	
					Water.	Other Solvents.
C_9H_{12}	Ethylotluene	159–160	·865	—	—	
C_8H_{10}	Methyltoluene.. ..	139–140	·862	—	—	
$C_7H_7NO_2$	Mononitrotoluene ..	238	—	—	—	
$C_8H_8O_2$	Alphatoluic acid ..	265·5	1·077	—	Soluble	Alcohol.
C_8H_8O	Toluic aldehyde ..	204	—	—	—	
C_8H_7OCl	,, chloride ..	214–216	1·175	—	—	
$C_{10}H_{12}O_2$	Ethylic toluate ..	228	—	—	Sparingly soluble	
C_7H_9N	Toluidine..	205–206	—	—	Slightly soluble.	
$C_{13}H_{13}N$	Phenyltoluidine ..	330	—	—	—	
$C_{14}H_{15}N$	Benzyltoluidine ..	355–360	—	—	—	
C_7H_9N	Benzylamine	182–183	—	—	Soluble	
$C_{13}H_{13}N$	Phenylbenzylamine	above 310	—	—	Insoluble	Alcohol, ether.
$C_{16}H_{18}$	Toluyl	296	—	—	—	
$C_8H_{10}O$	Toluylic alcohol ..	217	—	—	Soluble	,, ,,
C_8H_9Cl	,, chloride ..	193	—	—	—	
C_7H_7	Tolyl (benzyl) ..	284	—	—	Insoluble	Alcohol, ether, CS_2.

TABLE OF BOILING POINTS, &c.—*continued.*

Formula	Name.	Boiling Point, °C.	Specific Gravity, Water=1.	Vapour Density.	Solubility. Water.	Solubility. Other Solvents.
$C_9H_{11}NO_2$	Tolylacetamide ..	310–350	—	—	Soluble	Alcohol, ether.
$C_{14}H_{13}N$	Tolylbenzamide ..	232	—	—	Insoluble	,, ,,
$C_7H_{10}N_2$	Tolylene diamine ..	280	—	—	Soluble in hot	,, ,,
$C_9H_{20}O_3$	Triethylin	186	·895	—	Soluble	
$C_6H_{14}O_3$	Trimethylin	148	·943	—	,,	
C_3H_8O	Trityl alcohol (nor.)	96–97 (?)	—	—	,,	
C_3H_8O	Isopropyl alcohol (or Isotrytyl alcohol).	83–84	·791	—	,,	
C_3H_7Br	Bromide of isopropyl	60–63	1·320	—	—	
C_3H_7Cl	Chloride ,,	36–38	·874	—	—	
C_3H_7I	Iodide ,,	89–90	1·70	—	Insoluble	
C_3H_9N	Tritylamine (propylamine.)	50	—	—	Soluble	
$C_3H_8O_2$	Tritylenic alcohol (Propylglycol).	188–189	1·051	—	,,	,, ,,
$C_7H_{12}O_4$	Trytylenic acetate..	186	1·109	—	,,	Ether.
$C_3H_6Br_2$	,, bromid	144	1·974	—	—	
$C_3H_6Br_2$	,, chloride	103	1·151	—	Insoluble	

TABLE OF BOILING POINTS, &c.—*continued.*

	Name.	Boiling Point, °C.	Specific Gravity; Water=1.	Vapour Density.	Solubility.	
					Water.	Other Solvents.
$C_3H_6Cy_2$	Tritylenic cyanide	277–290	—	—	Soluble	Alcohol, ether.
$C_{10}H_{16}$	Turpentine oil, or terebenthene.	161	·864	—	Insoluble	
$C_5H_{10}O$	Valeral	96–97	·805	—	„	„ „
$C_5H_{10}O_2$	Valeric acid	175	·955	3·66	Soluble	Alcohol, ether, strong acetic acid.
$C_5H_9BrO_2$	Bromovaleric acid ..	226–230	—	—	—	
$C_{10}H_{18}O_3$	Valeric anhydride ..	215	·934	6·23	—	
C_5H_9OBr	„ bromide ..	143	—	—	—	
C_5H_9OCl	„ chloride ..	115–120	1·005	—	—	
C_5H_9OI	„ iodide	108	—	—	—	
$C_6H_{12}O_2$	Valerate of methyl..	116	·886	—	—	
$C_7H_{14}O_2$	„ ethyl ..	133	·894	—	Sparingly soluble	Alcohol.
$C_{10}H_{20}O_2$	„ amyl ..	187–196	·864	6·1	—	„
$C_8H_{16}O_3$	Valeroglyceral ..	224–228	1·027	5·526	Insoluble	
$C_9H_{18}O$	Valerone	165	—	—	„	Alcohol, ether.
C_5H_8	Valerylene	44–46	—	2·356	„	

TABLE OF BOILING POINTS, &c.—*continued.*

	Name.	Boiling Point, °C.	Specific Gravity, Water=1.	Vapour Density.	Solubility. Water.	Solubility. Other Solvents.
$C_5H_8Br_2$	Valerylene dibromide	166–172	—	—	—	
C_5H_7Br	Bromovalerylene ..	125–130	—	—	—	
C_5H_6	Valylene	50	—	—	—	
$C_8H_{10}O_2$	Veratrol	202–205	—	—	—	
$C_{12}H_{11}N$	Xenylamine	320	—	—	Soluble	Alcohol, ether.
C_8H_{10}	Xylene (or Xylol) ..	139	·86	—	—	
C_8H_9Br	Bromo-xylene ..	203–212	1·335	—	—	
C_8H_9Cl	Toluylic chloride isomeric with chloroxylene.	190–195	—	—	—	
$C_{10}H_4$	Ethylxylene	183–184	·878	—	—	
C_9H_{12}	Methylxylene.. ..	165–166	—	—	—	
$C_8H_9NO_2$	Nitroxylene	240	—	—	—	
$C_8H_{10}S$	Xylene sulphyrate ..	213	—	—	Insoluble	,, ,,
$C_9H_{10}O_2$	Xylylic acid	273	—	—	,,	,, ,,
$ZnC_{10}H_{22}$	Zincamyl	220	1·022	6·95	—	
ZnC_4H_{10}	Zincethyl	118	1·189	4·259	—	
ZnC_2H_6	Zincmethyl	46	1·386	3·291	—	

TABLE SHOWING THE MELTING POINTS AND BOILING POINTS OF THE METALS AND SOME OTHER ELEMENTS.

Element.	Melting Point.	Boiling Point.	Diff. between Melting and Boiling Point.
Aluminium ..	700° C.	..	..
Antimony	425°	..	..
Arsenic	412°	412° C.	0°
Bismuth	270°	..	..
Bromine	—7°	59°	66°
Cadmium	320°	860°	540°
Calcium	(?)	1040°	..
Chlorine	(?)	−50°	..
Cobalt..	1050°—1200°	..	..
Copper	1050°	..	..
Gold	1250°	..	..
Indium	176°	..	..
Iodine	107°	187°	80°
Iron—			
„ cast	1050°—1200°	..	..
„ steel	1300°—1400°	..	..
„ wrought ..	1500°—1600°	..	..
Lead	330°	1040°	710°
Lithium	180°	..	..
Magnesium ..	230°—235°	..	..
Mercury	−40°	350°	390°
Nickel	1500°—1600°	..	..
Phosphorus ..	44°	..	..
Potassium	62°·5	..	..
Platinum	2600°	..	..
Silver	1000°	..	..
Selenium	217°	700°	473°
Sodium	96°	..	..
Sulphur	115°	440°	325°
Tellurium	380°	..	..
Thallium	290°	..	..
Tin	235°	..	..
Zinc	412°	1040°	628°

KLEVER'S TABLE SHOWING THE SOLUBILITY OF SALTS IN GLYCERINE.

100 parts of Glycerine dissolve at 15·5° C.

	Parts by Weight.		Parts by Weight.
Alums	40	Phosphorus	0·20
Ammonium Carbonate	20	Potassium Arsenate	50
Ammonium Chloride	20	„ Bromide	25
Arsenious acid ..	20	„ Chlorate	3·5
Arsenic Oxide ..	20	„ Cyanide	32
Atropine	3	„ Iodide	40
„ Sulphate ..	33	Quinine..	·5
Barium Chloride ..	10	„ Tartrate ..	·25
Benzoic acid	10	Sodium Arsenate..	50
Boric acid	10	„ Biborate ..	60
Brucine	2·2	„ Bicarbonate	8
Calcium Sulphide ..	5	„ Carbonate	98
Cinchonine Sulphate	6·7	„ Chlorate ..	20
„	0·5	Sulphur	·10
Copper Acetate ..	10	Strychnine	·25
„ Sulphate ..	30	„ Nitrate	4
Iodine	1·9	„ Sulphate	22·50
Lead Acetate	20	Tannic acid	50
Mercuricum Chloride	7·5	Tartar emetic ..	5·5
„ Cyanide	27	Urea	50
Morphine	·45	Veratrine	1
„ Acetate ..	20	Zinc Chloride ..	50
Morphine Hydrochloride	20	„ Iodide	40
Oxalic acid	15	„ Sulphate ..	35

Table showing the Solubility of Lead in Water in the presence of various Salts.

Name of Salt in Solution.	Grams per Litre.	Grains per Gallon.	Lead Dissolved. Milligrams per Litre. 24 hours.	48 hours.	72 hours.	Lead Dissolved. Grains per Gallon. 24 hours.	48 hours.	72 hours.
Ammonium Nitrate ..	·02	1·4	13	..	35	·91	..	1·75
" "	·04	2·8	15	15	32	1·05	1·05	2·24
" "	·08	5·6	15	..	..	1·05	..	..
Potassium Nitrate	·02	1·4	2	2	..	·14	·14	..
Sodium Sulphate ..	·05	3·5						
Potassium Nitrate ..	·04	2·8	·8	1	1·2	·05	·07	·08
Sodium Sulphate ..	·212	14·7						
Potassium Nitrate ..	·045	3·1	..	..	·3	..	..	·021
Sodium Carbonate ..	·308	21·5						
Potassium Nitrate ..	·078	5·4	..	..	·5	..	..	·035
Potassium Carbonate	·504	35·2						
Calcium Sulphate	·252	17·5	·4	..	·8	·02	..	·05
" "	·458	28·5	·4	..	1·0	·02	..	·07
Potassium Carbonate	·31	21·7	..	..	·2	..	..	·014
" "	·516	36·1	..	..	·2	..	..	·014
Calcium Chloride ..	·25	17·5	·5	·5	·5	·04	·04	·04
" "	·51	35·7	·3	..	·4	·028	..	·028
Sodium Sulphate ..	·20	14·0	..	..	·8	..	..	·05
" "	·40	28·0	..	..	·5	..	..	·03
Ammonium Nitrate ..	·02	1·4	..	..	1·8	..	..	·126
Calcium Nitrate	·06	4·2						

TABLE SHOWING THE SOLUBILITY OF LEAD—*continued.*

Name of Salt in Solution.	Grams per Litre.	Grains per Gallon.	Lead Dissolved.					
			Milligrams per Litre.			Grains per Gallon.		
			24 hours.	48 hours.	72 hours.	24 hours.	48 hours.	72 hours.
Ammonium Chloride	·02	1·4						
Potassium Carbonate	·10	7·0	..	..	·4	..	..	·028
Sodium Sulphite ..	·20	14·0						
Sodium Sulphate ..	·20	14·0						
Potassium Carbonate	·04	2·8	..	..	·1	..	..	·007
Calcium Chloride	·10	7·0						
Loch Katrine	..	..	1	1	1·5	·07	·07	·105
Distilled water	..	..	2	2	3	·15	·15	·21

SOLUBILITY OF AIR IN WATER.

1 Vol. of Water dissolves under a pressure of 760 mm. and at t. °C.		1 Vol. of Water dissolves under a pressure of 760 mm. and at t. °C.		1 Vol. of Water dissolves under a pressure of 760 mm. and at t. °C.	
Temp.	Volume of Air.	Temp.	Volume of Air.	Temp.	Volume of Air.
0	·02471	7	·02080	14	·01822
1	·02406	8	·02034	15	·01795
2	·02345	9	·01992	16	·01771
3	·02287	10	·01953	17	·01750
4	·02237	11	·01916	18	·01732
5	·02179	12	·01882	19	·01717
6	·02128	13	·01851	20	·01704

Coefficients of Solubility of some Gases in Water and in Alcohol.

Gas.		0° C.	4° C.	10° C.	15° C.	20° C.
Nitrogen	in water	·02035	·01838	·01607	·01478	·01403
"	" alcohol	·12634	·12476	·12276	·12142	·12038
Hydrogen	" water	·01930	·01930	·01930	·01930	·01930
"	" alcohol	·06925	·06867	·06786	·00725	·066668
Oxygen	" water	·04114	·03717	·03250	·02989	·02838
"	" alcohol	·28397	·28397	·28397	·28397	·28397
Carbonic anhydride ..	" water	1·7987	1·5126	1·1847	1·0020	·9014
" "	" alcohol	4·3295	3·9736	3·5140	3·1993	2·9465
Carbonic oxide	" water	·03287	·02987	·02635	·02432	·02312
" "	" alcohol	·20443	·20443	·20443	·20443	·20443
Nitrous oxide	" water	1·3052	1·1346	·9196	·7778	·6700
" "	" alcohol	4·1780	3·9085	3·5408	3·2678	3·0253
Nitric oxide	" water	·31606	·30290	·28609	·27478	·26592
Marsh gas	" water	·05449	·04993	·04372	·03909	·03499
" "	" alcohol	·52259	·51135	·49535	·48280	·47096
Olefiant gas	" water	·2568	·2227	·1837	·1615	·1488
" "	" alcohol	3·5950	3·3750	3·0859	2·8825	2·7131
Butane	" water	·03147	·02770	·02355	·02147	·02065
Ethane	" water	·0874	·0748	·0599	·0508	·0447
Hydrogen sulphide ..	" water	4·3706	4·0442	3·5858	3·2326	2·9053
" " ..	" alcohol	17·891	15·373	11·992	9·539	7·415
Sulphurous anhydride	" water	79·789	69·828	56·647	47·276	39·374
" " ..	" alcohol	328·62	265·81	190·31	144·55	114·48
Ammonia	" water	1049·6	941·9	812·8	727·2	654·0
Air	" water	·02471	·02237	·01953	·01795	·01704

TABLE SHOWING THE PROPORTIONS OF VARIOUS SUBSTANCES

Temperature.	HBr.	HI.	Cl.	HCl grams dissolved by 1 gram Aq.	Br.	KNO_3.	$NaNO_3$.	H_3BO_3.	B_2O_3.	$B_4O_7Na_2 + 10$ Aq.	$NaHCO_3$.	NH_4Cl.	$HgCl_2$.	$(NH_4)_2SO_4$.	K_2CrO_4.	$K_2Cr_2O_7$.	$ZnSO_4 + 7$ Aq.
	Volumes, reduced to 0° C. and 760 mm., dis. by 1 Vol. Aq.				100 Parts of Water dissolve												
0°	—	—	1·43	·825	—	13·32	70·94	—	—	2·83	8·95	28·40	5·73	71·00	58·9	4·6	—
5	—	—	—	—	3·6	16·7	—	—	—	—	—	—	—	—	—	—	—
10	600	425	3·0	·772	3·327	—	78·57	—	—	4·65	10·04	32·84	6·57	73·65	60·92	7·4	138·21
15	—	—	—	·747	3·226	—	—	—	—	—	—	—	—	—	—	—	—
20	—	—	—	·721	3·208	—	87·97	—	—	7·88	11·15	37·28	7·39	76·30	62·94	12·4	161·5
25	—	—	—	—	3·167	38·4	—	6·8	3·6	—	—	—	—	—	—	—	—
30	—	—	—	·673	3·126	—	98·26	—	—	11·90	12·24	41·72	8·43	78·95	64·96	18·4	190·9
35	—	—	1·61	—	—	—	—	—	—	—	—	—	—	—	—	—	—
40	—	—	—	·633	—	—	109·01	—	—	17·90	13·35	46·16	9·62	81·60	66·98	25·9	—
45	—	—	—	—	—	74·6	—	—	—	—	—	—	—	—	—	—	—
50	—	—	1·19	·596	—	85	120	9·8	6·61	27·41	14·45	50·60	11·34	84·25	69·0	35·0	263·8
55	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
60	—	—	—	·561	—	—	131·11	—	—	40·43	15·57	55·04	13·86	86·90	71·02	45·0	—
65	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
70	—	—	·71	—	—	—	—	—		57·85	16·69	59·48	17·29	89·55	73·04	56·7	—
75	—	—	—	—	—	—	—	21	13·73	—	—	—	—	—	—	—	—
80	—	—	—	—	—	170	153·72	—	—	76·19	—	63·92	24·30	92·20	75·06	68·6	—
85	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
90	—	—	—	—	—	—	—	—	—	116·66	—	68·36	37·05	94·85	77·08	81·1	533·0
100	—	—	·15	—	—	246	178·18	34	21·09	201·43	—	72·80	53·96	97·5	79·10	94·1	653·6

DISSOLVED BY WATER AT DIFFERENT TEMPERATURES (CENTIGRADE).

$CuSO_4$ + 5 Aq.	$(NH_4)_2Al_2(SO_4)_4$ + 24 Aq.	$K_2Al_2(SO_4)_4$ + 24 Aq.	K_4FeCy_6 + 3 Aq.	$KHC_4H_4O_6$ (H. Pot. Tart.).		BaN_2O_6.	Na_2CO_3 + 10 Aq.	Na_2CO_3.	$KClO_3$.	$MgSO_4$.	$AgNO_3$.	$CaSO_4$ + 2 Aq.	KBr.	NaBr.	$SrCl_2$.	$BaCl_2O_6$.	$FeSO_4$ + 7 Aq.	Temperature.
Parts of the Salt—											1 Part of the Salt requires Parts of Water—							
—	5·52	3·90	—	·32	Temp. 0°	5·0	23·33	7·08	3·3	26·37	·82	—	1·87	1·29	2·27	4·38	—	0°
—	—	—	—	—	10	—	40·94	16·66	—	—	—	—	—	—	—	—	—	5
36·9	9·16	9·52	36	·40	14·95	8·18	—	—	—	—	—	—	—	—	1·88	—	1·64	10
—	—	—	—	—	15	—	—	—	6	—	—	—	—	—	—	—	1·43	15
42·3	13·66	15·13	—	·57	17·9	—	—	—	—	33·28	—	—	1·55	1·13	2·70	—	—	20
—	—	—	—	—	19·5	—	—	—	—	—	·44	—	—	—	—	—	—	25
—	19·29	22·01	—	·90	20	—	92·82	25·93	—	—	—	—	—	—	—	·87	—	30
—	—	—	—	—	24·1	—	—	—	—	35·98	—	480	—	—	—	—	—	35
56·9	27·27	30·92	—	1·31	25	—	149·13	30·83	—	—	—	—	1·34	·96	1·54	1·92	—	40
—	—	—	—	—	30	—	273·64	35·90	—	—	—	—	—	—	—	—	—	45
—	36·51	44·11	—	1·81	35	—	—	—	12	—	—	—	—	—	—	—	—	50
—	—	—	—	—	41	—	—	—	—	—	—	468	—	—	—	—	—	55
—	51·29	66·65	—	2·40	49·22	17·07	—	—	—	—	—	—	1·18	·90	1·18	1·29	·38	60
—	—	—	—	—	50	—	—	—	19	—	—	—	—	—	—	—	—	65
—	71·97	90·67	—	3·20	54	—	—	—	—	—	·20	—	—	—	—	—	—	70
—	—	—	—	—	85	—	—	—	—	—	·14	—	—	—	—	—	—	75
118·0	103·08	134·47	—	4·50	86	—	—	—	—	—	—	528	1·07	·89	1·08	1·02	—	80
—	—	—	—	—	99	—	—	—	—	—	—	571	—	—	—	—	—	85
—	187·82	209·31	—	5·70	104·6	—	539·63	48·5	—	—	—	—	—	—	—	—	·27	90
203·3	421·90	357·48	77·5	6·90	104·78	—	—	—	60	—	—	—	·98	·87	·98	·79	·30	100

A DICTIONARY OF THE SOLUBILITIES OF SOME OF THE MOST IMPORTANT SUBSTANCES.

Formula.	Name.	Solubility.
$C_4H_6O_3$	Acetic anhydride	Dissolves in water after a time, or on the application of heat to form the acid.
$C_2H_4O_2$	„ acid	Soluble in water, alcohol, hydrochloric, sulphuric, and nitric acids. The presence of water renders it insoluble in ether.
$Al_2C_{12}H_{18}O_{12}$	Acetate of aluminium..	Soluble in water to 10·6 per cent. at 12·5.
$(NH_4)C_2H_3O_2$	„ ammonium	Soluble in water and in alcohol.
$C_6H_9SbO_6$	„ antimony ..	Soluble in water.
$BaC_4H_6O_4+Aq$	„ barium ..	Soluble in water, sparingly soluble in alcohol; insoluble in ether.
$C_6H_9BiO_6$	„ bismuth ..	Soluble in water.
$C_4H_6CdO_4+3Aq$	„ cadmium ..	„ „
—	„ cerium ..	Soluble in water, sparingly in alcohol.
$C_{12}H_{18}Cr_2O_{12}$	„ chromium ..	Soluble in water.
—	„ cinchonidin	Very sparingly soluble in cold water.
$C_{20}H_{24}N_2O.C_2H_4O_2$	„ cinchonin ..	Decomposed into a soluble acid and insoluble basic salt; soluble in acetic acid.
$C_4H_6CoO_4+4Aq$	„ cobalt (ous)	Very soluble in water.
—	„ „ (ic) ..	Soluble in water; decomposed by boiling.
$C_4H_6Cu_2O_4$	„ copper (ous)	Insoluble in water; partially soluble in alcohol.
$C_4H_6CuO_4+Aq$	„ „ (ic) ..	Soluble in water and in alcohol; insoluble in ether.

A DICTIONARY OF THE SOLUBILITIES, &c.—*continued.*

Formula.	Name.	Solubility.
$C_{12}H_{18}Fe_2O_{12}$	Acetate of iron (ic) ..	Soluble in water and in alcohol; insoluble in chloroform and in ether.
$C_4H_6PbO_4$	" lead	Soluble in water and in alcohol; insoluble in ether.
$C_4H_6CaO_4+xAq$	" calcium ..	Soluble in water, less soluble in alcohol.
$C_2H_3LiO_2+2Aq$	" lithium ..	Soluble in water and in alcohol; sparingly soluble in ether.
$C_4H_6MgO_4+4Aq$	" magnesium	Soluble in water and in alcohol.
$C_4H_6MnO_4+4Aq$	" manganese ..	" " "
$C_4H_6Hg_2O_4$	" mercury (ous)	Sparingly soluble in cold, soluble in hot, water (with decom.); insoluble in alcohol.
$C_4H_6HgO_4$	" " (ic)	Soluble in water; decomposed by alcohol and by ether.
$C_{17}H_{19}NO_3 . C_2H_4O_2$	" morphine ..	Soluble in water, in alcohol, and in chloroform.
$C_4H_6NiO_4+5Aq$	" nickel ..	Soluble in water; insoluble in alcohol.
—	" nicotin ..	Soluble in water, in alcohol, and in ether.
$C_2H_3KO_2$	" potassium ..	Soluble in water, alcohol, acetic acid, but insoluble in ether.
$C_{20}H_{24}N_2O_2 . C_2H_4O_2$	" quinine ..	Soluble in water and in alcohol.
$C_2H_3AgO_2$	" silver	Soluble in water, readily soluble in cyanide of potassium.

A DICTIONARY OF THE SOLUBILITIES, &c.—*continued.*

Formula.	Name.	Solubility.
$C_2H_3NaO_2+3Aq$	Acetate of sodium ..	Soluble in water, alcohol, and boiling creosote; insoluble in ether.
$C_4H_6SrO_4+xAq$	" strontium ..	Soluble in water and in alcohol; insoluble in creosote.
$C_{21}H_{22}N_2O_2 \cdot C_2H_4O_2$	" strychnine ..	Soluble in water and in alcohol.
$C_4H_6SnO_4$	" tin (ous) ..	Soluble in water; insoluble in alcohol.
$C_8H_{12}SnO_8$	" " (ic) ..	Soluble in water.
—	" titanium ..	" "
$C_2H_3O_2(U_2O)$	" uranium ..	Soluble in water and in alcohol.
$C_4H_6ZnO_4+3Aq$	" zinc	Soluble in alcohol, in water, and in creosote.
—	Albumen (soluble modification).	Soluble in water; insoluble in alcohol and in ether.
—	Albumen (insoluble modification).	Insoluble in water, in alcohol, and in ether; soluble in warm acetic, tartaric, and phosphoric acids.
C_2H_6O	Alcohol	Soluble in wood-spirit, chloroform, ether, naphtha, benzin, water, &c. (see Alcohol Tables).
NH_3	Ammonia	Soluble in water (see Sp. Gr. Tables).
—	Antimoniates	Nearly all insoluble, or very slightly soluble in water.

A DICTIONARY OF THE SOLUBILITIES, &c.—*continued.*

Formula.	Name.	Solubility.
—	Arseniates	Nearly all insoluble, or nearly insoluble, in water. Arseniates of potassium and sodium are soluble.
—	Benzoates	Nearly all soluble in water; benzoate of silver is sparingly soluble.
BH_3O_3	Boric acid	Soluble in water (especially if hot) and in alcohol.
—	Borates	All the borates, except those of the alkali metals and ammonium, are difficultly soluble in water, and insoluble, or nearly insoluble, in alcohol; soluble in boric acid.
$HBrO_3$	Bromic acid	Soluble in water, decomposed by alcohol and ether.
$Al_2Br_6O_{18}$	Bromate of aluminium	Soluble in water.
$(NH_4)BrO_3$	" ammonium	" "
$BaBr_2O_6+Aq$	" barium ..	" "
$CdBr_2O_6+Aq$	" cadmium ..	" "
$CaBr_2O_6+Aq$	" calcium ..	Soluble in 1·1 part of cold water.
$Cr_2Br_6O_{18}$	" chromium ..	Soluble in water.
$CoBrO_6+6Aq$	" cobalt ..	Soluble in water and in ammonia water.
$CuBr_2O_6+5Aq$	" copper ..	Soluble in water.
$Fe_2Br_6O_{18}$	" iron (ic) ..	" "
$PbBr_2O_6+Aq$	" lead	" "

A DICTIONARY OF THE SOLUBILITIES, &c.—*continued.*

Formula.	Name.	Solubility.
$LiBrO_3$	Bromate of lithium ..	Soluble in water.
$MgBr_2O_6+6Aq$	" magnesium	Soluble in 1·4 part water at 15°.
$Hg_2Br_2O_6$	" mercury (ous)	Insoluble in water, but decomposed when boiled with it.
$HgBr_2O_6+2Aq$	" " (ic)	Soluble in 650 parts of cold and in 64 parts of boiling water.
$NiBr_2O_6+6Aq$	" nickel ..	Soluble in 3·58 parts of cold water.
$KBrO_3$	" potassium ..	Soluble in 15·2 parts of water at 15°; much more soluble at 100°; insoluble in absolute alcohol.
$AgBrO_3$	" silver ..	Insoluble in water and in nitric acid; soluble in ammonia.
$NaBrO_3$	" sodium ..	Soluble in 2·7 parts of water at 15°.
$SrBr_2O_6+Aq$	" strontium ..	Soluble in 3 parts of cold water.
$ZnBr_2O_6+6Aq$	" zinc	Soluble in water.
Br_2	Bromine	Soluble in 33·3 parts of water at 15°, in alcohol, in ether, in CS_2; insoluble in benzine.
Al_2Br_6	Bromide of aluminium	Soluble in water and in alcohol.
NH_4Br	" ammonium	Soluble in water; sparingly soluble in alcohol.
$SbBr_3$	" antimony ..	Decomposed by water.
$AsBr_3$	" arsenic ..	" "

A DICTIONARY OF THE SOLUBILITIES, &c.—*continued.*

Formula.	Name.	Solubility.
$BaBr_2+2Aq$	Bromide of barium ..	Soluble in water and in alcohol.
$BiBr_3$	„ bismuth ..	Decomposed by water.
BBr_3	„ boron	„ „
$CdBr_2$	„ cadmium ..	Soluble in water, in alcohol, in ether, and in wood-spirit.
$CaBr_2$	„ calcium ..	Soluble in ·80 part of water at 0°; in ·32 part at 105°.
$CoBr_2$	„ cobalt ..	Soluble in water, in alcohol, and in ether.
Cu_2Br_2	„ copper (ous)	Soluble in hydrochloric and hydrobromic acids; insoluble in water and in sulphuric acid; soluble in ammonia.
$CuBr_2+5Aq$	„ „ (ic)	Soluble in water.
$AuBr_3$	„ gold	Soluble in water and in ether.
Fe_2Br_6	„ iron (ic) ..	Soluble in water, in alcohol, and in ether.
$PbBr_2$	„ lead	Sparingly soluble in boiling water; soluble in hydrochloric, nitric, and acetic acids, and in solutions of ammonium chloride or nitrate.
$LiBr$	„ lithium ..	Soluble in ·70 part of water at 0°, and in ·37 part at 103°.
$MgBr_2+6Aq$	„ magnesium	Soluble in water and in alcohol.
$MnBr_2$	„ manganese	Soluble in water.

A DICTIONARY OF THE SOLUBILITIES, &c.—*continued.*

Formula.	Name.	Solubility.
Hg_2Br_2	Bromide of mercury(ous)	Insoluble in water and in alcohol; soluble in mercurous nitrate.
$HgBr_2$	" " (ic)	Soluble in 250 parts of cold, and in 25 parts of boiling, water, soluble in alcohol and in ether.
$NiBr_2+3Aq$	" nickel ..	Soluble in water, in alcohol, and in ether.
KBr	" potassium ..	Soluble in 4 parts of cold, and in 1 part of boiling, water, soluble in alcohol.
$AgBr$	" silver ..	Insoluble in water; sparingly soluble in ammonia; sparingly soluble in KI, KBr, and some other solutions.
$NaBr$	" sodium ..	Soluble in water; sparingly soluble in alcohol.
$SrBr_2$	" strontium ..	Soluble in water, and somewhat soluble in alcohol.
$SnBr_2$	" tin (ous) ..	Soluble in water.
$SnBr_4$	" " (ic) ..	" "
$ZnBr_2$	" zinc	Soluble in water, in alcohol, in ether, in ammonia, in hydrochloric and acetic acids.
$C_4H_8O_2$	Butyric acid	Soluble in alcohol, in water, and in wood-spirit; soluble in ether.
—	Butyrates..	All the butyrates are soluble in water.

A DICTIONARY OF THE SOLUBILITIES, &c.—*continued.*

Formula.	Name.	Solubility.
$C_8H_{10}N_4O_2$	Caffein	Soluble in hot water, in alcohol, and sparingly soluble in ether; soluble in chloroform.
$C_{10}H_{16}O$	Camphor	Soluble in 1000 parts of water; soluble in alcohol, in ether, in acetone, and in benzine.
$C_6H_{12}O_2$	Caproic acid	Soluble in water in alcohol, and in ether.
—	Caproates..	Caproates of Ba, Mg, K, Ag (sparingly), Na, Sr, soluble in water.
—	Carbamates	Carbamates of amyl, butyl, ethyl, methyl; soluble in alcohol.
CO_2	Carbonic anhydride (liquid).	Insoluble in water; soluble in alcohol, ether, CS_2, oil of turpentine.
—	Carbonates of ammonium	Soluble in water, decomposed in boiling.
$BaCO_3$	Carbonate of barium ..	Soluble in 12027 parts of water at 15°; soluble in a solution of carbonic acid; soluble in ammonic nitrate and choloride.
$Bi_2O_3.CO_2$	" bismuth ..	Insoluble in water; soluble in ammonic carbonate.
$CdCO_3$	" cadmium..	Insoluble in water; soluble in solutions of alkaline carbonates and in some ammonium salts.

A DICTIONARY OF THE SOLUBILITIES, &c.—*continued.*

Formula.	Name.	Solubility.
$CuCO_3$	Carbonate of copper ..	Insoluble in water; sparingly soluble in carbonic acid water; soluble in many ammonium salts, and in ammonia.
$PbCO_3$	" lead	Slightly soluble in water; soluble in ammonium salts.
$CaCO_3$	" calcium ..	Slightly soluble in carbonic acid, in ammonium chloride, and in some potash and soda salts.
Li_2CO_3	" lithium ..	Difficultly soluble in cold, soluble in hot, water.
$MgCO_3+xAq$	" magnesium	Slightly soluble in water; soluble in some ammonium salts.
$MnCO_3$	" manganese	Insoluble in water; soluble in ammonium chloride.
Hg_2CO_3	" mercury (ous).	Decomposed by hot water; soluble in ammonium chloride.
$HgCO_3$	" mercury(ic)	Soluble in ammonium chloride.
$NiCO_3+xAq$	" nickel ..	Soluble in carbonate and in chloride of ammonium.
K_2CO_3	" potassium	Soluble in about 1 part of water at ordinary temperature; soluble in spirit.
$KHCO_3$	Bicarbonate of "	Soluble in 3·5 parts of water at 15°; insoluble in alcohol.
Na_2CO_3	Carbonate of sodium ..	Soluble in about 6 parts of water at 15°; insoluble in alcohol.

A DICTIONARY OF THE SOLUBILITIES, &c.—*continued.*

Formula.	Name.	Solubility.
$SrCO_3$	Carbonate of strontium	Soluble in ammonium chloride.
—	„ strychnine	Soluble in carbonic acid water.
$ZnCO_3+Aq$	„ zinc	Soluble in ammonium chloride.
$C_{18}H_{30}O_{15}$	Cellulose	Insoluble in water, alcohol, ether, or oils; soluble in solution of ammonio-cupric oxide.
$HClO_3$	Chloric acid	Soluble in water.
$(NH_4)ClO_3$	Chlorate of ammonium	(Explosive if kept); soluble in water and in alcohol.
$BaCl_2O_6+Aq$	„ barium ..	Soluble in 4 parts of cold and less warm water; insoluble in alcohol.
$CaCl_2O_6+2Aq$	„ calcium ..	Soluble in water and in alcohol.
$CoCl_2O_6+6Aq$	„ cobalt	„ „ „
$CaCl_2O_6+6Aq$	„ copper	„ „ „
$Fe_2Cl_6O_{18}$	„ iron (ic) ..	Soluble in water; the basic salt is insoluble.
$PbCl_2O_6+Aq$	„ lead	Soluble in water and in alcohol.
$MgCl_2O_6+6Aq$	„ magnesium	„ „ „
$Hg_2Cl_2O_6$	„ mercury (ous)	There is a soluble and an insoluble modification.
$HgCl_2O_6$	„ „ (ic)	Soluble in about 4 parts of cold water.
$NiCl_2O_6+6Aq$	„ nickel	Soluble in water and in alcohol.
$KClO_3$	„ potassium ..	Almost the least soluble of all chlorates.
$AgClO_3$	„ silver	Soluble in water and in alcohol.

A DICTIONARY OF THE SOLUBILITIES, &c.—*continued.*

Formula.	Name.	Solubility.
$NaClO_3$	Chlorate of sodium ..	Soluble in water; somewhat soluble in alcohol.
$SrCl_2O_6+5Aq$	" strontium ..	Soluble in water, soluble in alcohol.
$ZnCl_2O_6+6Aq$	" zinc	Soluble in water and in alcohol.
HCl	Hydrochloric acid	Soluble in water, alcohol, ether (see Sp. Gr. Table of HCl).
Al_2Cl_6	Chloride of aluminium ..	Soluble in water, alcohol, and ether.

Sp. Gr. at 15°.	Al_2Cl_6 per cent.	Sp. Gr. at 15°.	Al_2Cl_6 per cent.
1·0072 ..	.. 1	1·1967 ..	.. 25
1·0360 ..	.. 5	1·2422 ..	.. 30
1·0733 ..	.. 10	1·2905 ..	.. 35
1·1125 ..	.. 15	1·3415 ..	.. 40
1·1537 ..	.. 20		

Formula.	Name.	Solubility.
NH_4Cl	" ammonium	Soluble in about 2·8 parts of water at ordinary temperature; soluble in alcohol; insoluble in ether and in CS_2.

Sp. Gr. at 15°.	NH_4Cl per cent.	Sp. Gr. at 15°.	NH_4Cl per cent.
1·0032 ..	.. 1	1·0452 ..	.. 15
1·0158 ..	.. 5	1·0593 ..	.. 20
1·0308 ..	.. 10	1·0730 ..	.. 25

A DICTIONARY OF THE SOLUBILITIES &c.—*continued.*

<table>
<tr><th>Formula.</th><th>Name.</th><th>Solubility.</th></tr>
<tr><td>$SbCl_3$</td><td>Chloride of antimony ..</td><td>Decomposed by water; soluble in alcohol and in sodium chloride.</td></tr>
<tr><td>$AsCl_3$</td><td>" arsenic ..</td><td>Decomposed by much water; soluble in alcohol and in ether.</td></tr>
<tr><td>$BaCl_2+2Aq$</td><td>" barium ..</td><td>Soluble in water; insoluble in alcohol.
<table>
<tr><th>Sp. Gr. at 15°.</th><th>$BaCl_2$ per cent.</th><th>Sp. Gr. at 15°.</th><th>$BaCl_2$ per cent.</th></tr>
<tr><td>1·0092 ..</td><td>.. 1</td><td>1·1485 ..</td><td>.. 15</td></tr>
<tr><td>1·0458 ..</td><td>.. 5</td><td>1·2061 ..</td><td>.. 20</td></tr>
<tr><td>1·0951 ..</td><td>.. 10</td><td>1·2702 ..</td><td>.. 25</td></tr>
</table></td></tr>
<tr><td>$BiCl_3$</td><td>" bismuth ..</td><td>Decomposed by water; soluble in hydrochloric acid.</td></tr>
<tr><td>$CdCl_2+2Aq$</td><td>" cadmium ..</td><td>Soluble in ·7 part of water at 20°; soluble in alcohol.</td></tr>
<tr><td>$CaCl_2+6Aq$</td><td>" calcium ..</td><td>Soluble in about 1·5 part of water at ordinary temperature; soluble in alcohol.
<table>
<tr><th>Sp. Gr. at 15°.</th><th>$CaCl_2$ per cent.</th><th>Sp. Gr. at 15°.</th><th>$CaCl_2$ per cent.</th></tr>
<tr><td>1·0085 ..</td><td>.. 1</td><td>1·1822 ..</td><td>.. 20</td></tr>
<tr><td>1·0426 ..</td><td>.. 5</td><td>1·2336 ..</td><td>.. 25</td></tr>
<tr><td>1·0869 ..</td><td>.. 10</td><td>1·2879 ..</td><td>.. 30</td></tr>
<tr><td>1·1336 ..</td><td>.. 15</td><td>1·3443 ..</td><td>.. 35</td></tr>
</table></td></tr>
</table>

A DICTIONARY OF THE SOLUBILITIES, &C.—*continued.*

Formula.	Name.	Solubility.
Cr_2Cl_6	Chloride of chromium (ic)	Soluble in water and in alcohol; violet chloride of chromium is insoluble in water.
$CoCl_2$	„ cobalt	Soluble in water, in alcohol, and sparingly in ether.
Cu_2Cl_2	„ copper (ous)	Insoluble in water; sparingly soluble in ether; soluble in strong hydrochloric acid, in ammonia, and in sodium chloride.
$CuCl_2+Aq$	„ „ (ic) ..	Soluble in water, in alcohol, and in ether.
		Sp. Gr. at 12·5°. — Per cent. — Sp. Gr. at 12·5°. — Per cent.
		1·054 .. .. 10 — 1·176 30
		1·111 .. .. 20 — 1·247 38
$AuCl_3$	„ gold	Soluble in water, in alcohol, in ether, and in hydrochloric acid.
ICl	„ iodine (ous)	Soluble in water, in alcohol, and in ether.
$FeCl_2$	„ iron (ous) ..	Soluble in water and in alcohol; insoluble in ether.
Fe_2Cl_6	„ „ (ic) ..	Soluble in water, in alcohol, and in ether.

A DICTIONARY OF THE SOLUBILITIES, &c.—*continued.*

Formula.	Name.	Solubility.
$PbCl_2$	Chloride of lead	Sparingly soluble in cold (in 135 parts at 12·5° C.), soluble in hot, water; insoluble in alcohol.
$LiCl$	" lithium ..	Intensely deliquescent; soluble in water, alcohol, and ether.
$MgCl_2$	" magnesium	Soluble in water (in 1·8 at 15° C.); soluble in alcohol.

Sp. Gr. at 15°.	$MgCl_2$ per cent.	Sp. Gr. at 15°.	$MgCl_2$ per cent.
1·0084 ..	.. 1	1·1780 ..	.. 20
1·0422 ..	.. 5	1·2274 ..	.. 25
1·0859 ..	.. 10	1·2794 ..	.. 30
1·1310 ..	.. 15	1·3340 ..	.. 35

Formula.	Name.	Solubility.
$MnCl_2$	" manganese	Soluble in water (in 1·6 at 10° C.) and in alcohol.
Hg_2Cl_2	" mercury (ous)	Insoluble in water, in alcohol, and in ether; soluble, with decomposition, in warm hydrochloric acid or sodium chloride; soluble in warm nitrate or chloride of ammonium.
$HgCl_2$	" " (ic)	Soluble in water, in alcohol, and in ether.
$NiCl_2$	" nickel	Freshly sublimed, it is difficultly soluble in water; soluble in alcohol.
$PtCl_4$	" platinum ..	Soluble in water, in alcohol, and in ether.

A DICTIONARY OF THE SOLUBILITIES, &c.—*continued*

Formula.	Name.	Solubility.
KCl	Chloride of potassium ..	Soluble in water (in 3 parts at 15° C.). Sp. Gr. at 15°. / KCl per cent. / Sp. Gr. at 15°. / KCl per cent. 1·0065 .. .. 1 / 1·1004 .. 15 1·0325 .. .. 5 / 1·1361 .. 20 1·0658 .. .. 10 / 1·1723 .. 24·9
AgCl	" silver	Soluble in alcohol; insoluble in ether and in CS_2. Insoluble in water; soluble in ammonia, in alkaline chlorides and hyposulphites; soluble in strong hydrochloric acid,(spar.) in glycerine.
NaCl	" sodium ..	100 parts of water dissolve about 36 parts of it at all temperatures; soluble in alcohol; insoluble in ether and in hydrochloric acid.
$SrCl_2+6Aq$	" strontium ..	Soluble in water; soluble in alcohol.
$SnCl_2+2Aq$	" tin (ous) ..	Soluble in water, alcohol, and hydrochloric acid.
$SnCl_4$	" " (ic) ..	Soluble in water; soluble in alcohol.
$ZnCl_2$	" zinc	Soluble in water. Sp. Gr. at 19·5°. / $ZnCl_2$? per cent. / Sp. Gr. at 19·5°. / $ZnCl_2$? per cent. 1·011 .. .. 2 / 1·307 .. .. 50 1·115 .. .. 20 / 1·425 .. .. 64 1·236 .. .. 40 / 1·598 78

A DICTIONARY OF THE SOLUBILITIES, &c.—*continued.*

Formula.	Name.	Solubility.
—	Chloroplatinates (double chlorides of platinum).	Chloroplatinates of allylamine, tetrallylamin, aluminium, ammonium, amylamine, diamylamine, anilin, atropin, barium, bromanilin, butylamin, caffein, chloranilin, cinchonin, codein, collidin, coniin, creatinin cyananilin, ethylamin, diethylamin, triethylamin ethylanilin, ethylnicotin, ethylquinine, ethylstrychnine, guanine, lithium, lutidin, magnesium, methylamine, dimethylamine methylanilin, methylethylanilin, methylnicotin, naphthylamine, nicotine, nitraniline, octylamine, picolin, piperidin, potassium, propylamine, pyridin, quinine, sodium, zinc, silver, are soluble, or sparingly soluble, in water.
H_2CrO_4	Chromic acid	Soluble in water, in alcohol, and in ether.
—	Chromates	The following are soluble in water:—Chromates of Am, Co, Ca, Cu, Mg, Mn, Hg″ (sparingly), Ni, K, Na, Sr (sparingly), Zn. The following are insoluble in water:—Chromates of Al, Sb, Ba, Bi, Cr, Be, Fe^{iv}, Pb, Hg′, Ag, &c.

A DICTIONARY OF THE SOLUBILITIES, &c.—*continued.*

Formula.	Name.	Solubility.
—	Cinchonidine	Nearly insoluble in water; soluble in alcohol and in ether.
$C_{20}H_{24}N_2O$	Cinchonine	Sparingly soluble in boiling water; soluble in hot alcohol, in chloroform (sparingly), and in acids; insoluble in ether.
$C_9H_8O_2$	Cinnamic acid	Sparingly soluble in cold; soluble in hot water; soluble in alcohol and in ether.
—	Cinnamates	Cinnamates of Al, Am, Ba, Ca, K, Na, Zn, Mn, Mg are soluble in hot water.
		The following are insoluble:—Cinnamates of Cd, Co, Ni, Pb, Ag, Cu (decomposed).
		Many cinnamates are soluble in alcohol.
$C_5H_6O_4$	Citraconic acid	Soluble in water, in alcohol, and in ether.
—	Citraconates	The following are soluble in water:—Citraconates of Ba, Pb, Ca, Ni, Mg, K, Ag, Na, Sr.
$C_6H_8O_7$	Citric acid	Soluble in water, in alcohol, and spar. in ether.
—	Citrates	Most of the citrates are soluble in water.
$C_8H_{15}N$	Coniin or Conine	Sparingly soluble in water; soluble in alcohol, ether, oils.
$C_8H_{10}O_2$	Creosol	Insoluble in water; soluble in alcohol, ether, and alkalies.

A DICTIONARY OF THE SOLUBILITIES, &c.—*continued.*

Formula.	Name.	Solubility.
—	Creosote	Sparingly soluble in water; soluble in alcohol, ether.
$C_9H_6O_2$	Cumarin..	Soluble in hot water and in alcohol.
KC_yO	Cyanate of potassium ..	Soluble in water; insoluble in cold absolute alcohol; soluble in hot spirit of 82 per cent.
—	Cyanides	The cyanides of the alkalies are soluble in water; the cyanides of the alkaline earths and of Hg'' are soluble; all others are insoluble (Gerhardt).
CN	Cyanogen	Absorbed by water, alcohol, and ether.
$C_6H_{10}O_5$	Dextrin	Soluble in hot water; insoluble in alcohol.
—	Digitalin	Sparingly soluble in water; soluble in alcohol.
—	Elaidates	The metallic elaidates, except those of the alkalies, are insoluble in water, but decomposed by excess.
$C_{21}H_{24}O_{13}$	Esculin	Soluble in hot water and hot alcohol.
—	Essential oils..	Are generally a little soluble in water, and soluble in alcohol and in ether.
$(C_2H_5)_2$	Ethyl	Insoluble in water; soluble in alcohol.
—	Ethylamine (mono-, di-, and tri-).	Soluble in water and acids.

A DICTIONARY OF THE SOLUBILITIES, &c.—*continued.*

Formula.	Name.	Solubility.
$C_8H_{11}N$	Ethylanilin	Soluble in alcohol.
C_2H_4	Ethylene	Sparingly soluble in water, alcohol, ether.
$C_2H_7PO_4$	Ethyl-phosphoric acid..	Soluble in water, alcohol, ether.
—	Ethyl phosphates.. ..	Soluble: Am, Ba, Cu, Fe, Mg, Mn, Ni, Pt, K, Na. Insoluble: Pb, Ca (sparingly soluble), Ag.
$C_2H_6SO_4$	Ethylsulphuric acid ..	Soluble in water and in alcohol.
—	Ethylsulphate of barium	Soluble in water; insoluble in cold absolute alcohol.
—	Ethylsulphates	Soluble in water, especially if hot. Only the Am. salt is soluble in ether.
—	Fats..	A trace only of natural fats dissolves in water; sparingly soluble in alcohol; soluble in ether, naphtha, benzin.
—	Ferrates..	All the ferrates, except those of the alkalies, are insoluble in water.
$H_6Fe_2Cy_{12}$	Ferricyanhydric acid ..	Soluble in water and in alcohol.
—	Ferricyanides	The ferricyanides of metals, the oxides of which are soluble in ammonia, are themselves soluble in solutions of ammonia and potash (Reynoso). The following are soluble in water:—Ferricyanides of quinine, Am, Ba, Ca, Pb (slightly), Mg, K, Na.

A DICTIONARY OF THE SOLUBILITIES, &c.—*continued.*

Formula.	Name.	Solubility.
H_4FeCy_6	Ferrocyanhydric acid ..	Soluble in water and in alcohol; insoluble in ether.
—	Ferrocyanides	Ferrocyanides of Am, Ba, Ca, Mg, K, Na, Sr are soluble. Those of Al, Bi, Co, Cu, Fe, Pb, Mn, Ni, Ag, Sn, Zn are insoluble; many of the latter are soluble in ammonia.
—	Fluoborates	Fluoborates of K, Na, Am, Mg, Cu, Ba are soluble in water.
HFl	Fluorhydric acid	Soluble in water and in alcohol.
Al_2Fl_6	Fluoride of aluminium	Insoluble in water and in acids.
NH_4Fl	" ammonium	Soluble in water; sparingly soluble in alcohol.
$BaFl_2$	" barium ..	Sparingly soluble in water; soluble in acids.
$BiFl_3$	" bismuth ..	Soluble in water; decomposed by evaporation.
$CaFl_2$	" calcium ..	Slightly soluble in water (1 in 26923).
Cr_2Fl_6	" chromium ..	Soluble in water.
$CoFl_2+2Aq$	" cobalt ..	Slightly soluble in water; more soluble in HFl.
Cu_2Fl_2	" copper (ous)	Insoluble in water or in HFl.
$CuFl_2$	" " (ic)	Difficultly soluble in a small quantity of water.
$FeFl_2+xAq$	" iron (ous) ..	Very difficultly soluble in water; soluble in HFl.

A DICTIONARY OF THE SOLUBILITIES, &c.—*continued.*

Formula.	Name.	Solubility.
Fe_2Fl_6	Fluoride of iron (ic) ..	Soluble in water.
$PbFl_2$	" lead	Very slightly soluble in water; soluble in hydrochloric and nitric acids.
$LiFl$	" lithium ..	Sparingly soluble in water.
$MgFl_2$	" magnesium	Insoluble in water, nearly insoluble in acids.
Mn_2Fl_6	" manganese (ic).	Soluble in small quantity of water.
Hg_2Fl_2	" mercury (ous)	Insoluble in water.
$HgFl_2$	" mercury (ic)	Soluble in water (decomposed ?).
$NiFl_2$	" nickel ..	Slightly soluble in water; soluble in HF.
$PtFl_4$	" platinum (ic)	Soluble in water; decomposed if hot.
KFl	" potassium ..	Soluble in water; sparingly soluble in alcohol.
$SiFl_4$	" silicon ..	Soluble in water, with decomposition; soluble in alcohol and in ether.
$AgFl$	" silver	Soluble in water.
$NaFl$	" sodium ..	Soluble in water (equally in cold as in hot); insoluble in alcohol.
$SnFl_2$	" tin (ous) ..	Soluble in water.
$ZnFl_2$	" zinc	Sparingly soluble in water; soluble in acids and in ammonia.

A DICTIONARY OF THE SOLUBILITIES, &c.—*continued.*

Formula.	Name.	Solubility.
—	Fluosilicates	The fluosilicates of Al, Am, Cd, Co, Cr, Fe, Pb, Cu, Mn, Mg, Na (sparingly), Zn, are soluble; those of Li, K, Hg′, Ba, Ca, are insoluble, or sparingly soluble.
—	Fumarates	Many are soluble in water, none in strong alcohol.
$C_7H_6O_5$	Gallic acid	Soluble in water (1 in 100 cold—1 in 3 hot); soluble in alcohol; less soluble in ether.
—	Gallates	Insoluble, except those of the alkalies; soluble in alcohol; sparingly soluble in ether.
$C_{27}H_{22}O_{17}$	Gallotannic acid	Soluble in water, in alcohol, and in ether.
—	Gallotannates	Those of Am, aniline, Ca, K, Na, are soluble in water; those of Sb, Ba, Cd, Cu, Fe^{IV}, Pb, Zn, are insoluble or sparingly soluble.
$C_6H_{12}O_6$	Glucose	Soluble in hot water and in alcohol; insoluble in ether.
—	Gluten	Nearly insoluble in water; soluble in hot alcohol.
$C_3H_8O_3$	Glycerine	Soluble in water and in alcohol; insoluble in ether.
$C_{12}H_{22}O_{11}$	Gum arabic (arabin) ..	Soluble in water; insoluble in alcohol and in ether.

A DICTIONARY OF THE SOLUBILITIES, &c.—*continued.*

Formula.	Name.	Solubility.
—	Hippurates	The acid is soluble in hot water and in alcohol, insoluble in ether. All the hippurates (except of ferricum) are soluble in hot water, many of them in hot alcohol.
—	Hydrates	*Vide* oxides.
H_2	Hydrogen	100 volumes of water at 18° absorb 4·6 volumes of it; 100 volumes of alcohol (·84 sp. gr.) absorb 5·1 volumes of it at 18°.
—	Hypophosphites	The acid is soluble in water and in alcohol; all the salts are soluble in water.
—	Hyposulphates (thiosulphates).	The acid is soluble in water; decomposed by boiling. All the normal salts are soluble in water, but insoluble or sparingly soluble in alcohol.
C_8H_5NO	Indigo (blue)..	Insoluble in water, alcohol, ether; soluble in fuming sulphuric acid.
HIO_3	Iodic acid	Soluble in water; insoluble in absolute alcohol.
—	Iodates	The metallic iodates, except those of the alkalies, are insoluble in water, and all are insoluble in alcohol.

A DICTIONARY OF THE SOLUBILITIES, &c.—*continued.*

Formula.	Name.	Solubility.
HI	Hydriodic acid	Soluble in water and in alcohol.
Al_2I_6	Iodide of aluminium ..	Soluble in water.
NH_4I	" ammonium ..	Soluble in water and in alcohol.
SbI_3	" antimony ..	Decomposed by water.
AsI_3	" arsenic	Soluble in a large quantity of water (a small quantity decomposes it); soluble in hot alcohol.
BaI_2	" barium	Soluble in water and in alcohol.
BiI_3	" bismuth.. ..	Decomposed by water.
CdI_2	" cadmium ..	Soluble in water, alcohol, in boiling ether (spar.).
CaI_2	" calcium	Soluble in water and in absolute alcohol.
Cr_2I_6	" chromium (ic)	Soluble in water.
CoI_2	" cobalt	Soluble in water and in alcohol.
Cu_2I_2	" copper (ous) ..	Insoluble in water and in alcohol; soluble in KI.
AuI	" gold (ous) ..	Insoluble in cold, decomposed by hot water and by alcohol.
FeI_2+4Aq	" iron (ous) ..	Soluble in water, in alcohol, and in glycerine.
PbI_2	" lead	Soluble in hot water, very sparingly in cold.

A DICTIONARY OF THE SOLUBILITIES, &c.—*continued.*

Formula.	Name.	Solubility.
LiI	Iodide of lithium	Soluble in water.
MgI_2	" magnesium ..	Soluble in water; partially decomposed in evaporation.
MnI_2	" manganese ..	Soluble in water.
Hg_2I_2	" mercury (ous)	Insoluble in water; soluble in ether.
HgI_2	" " (ic)	Insoluble in water; soluble in alcohol, glycerine, KI, and many other salts.
NiI_2+6Aq	" nickel	Soluble in water.
PdI_2	" palladium ..	Insoluble in water, alcohol, ether, or KI; soluble in ammonia (with decomposition).
PtI_2	" platinum (ous)	Insoluble in water; decomposed by HI, KI.
PtI_4	" " (ic)	Insoluble in water; sparingly soluble in alcohol.
KI	" potassium ..	Soluble in water (1 in ·7 at 16° C.), alcohol, glycerine.
AgI	" silver	Insoluble in water and nearly insoluble in NH_4HO; soluble in KCl, NaCl (conc.).
NaI	" sodium	Soluble in water and in alcohol.
SrI_2	" strontium ..	Soluble in water.
—	" sulphur	Insoluble in water; decomposed by alcohol.
SnI_2	" tin (ous) ..	Sparingly soluble in water.
SnI_4	" " (ic)	Decomposed by water; soluble in alcohol.
ZnI_2	" zinc	Soluble in water and in alcohol.

A DICTIONARY OF THE SOLUBILITIES, &c.—*continued.*

Formula.	Name.	Solubility.
	Iron..	Unacted on by cold concentrated nitric acid; dissolved by the dilute acid, as by dilute sulphuric and hydrochloric acids; soluble in $CuSO_4$ with precipitate of Cu; soluble in strong solutions of the alkaline bicarbonates.
$C_4H_6O_6$	Isotartaric acid	Soluble in water and in alcohol.
—	Itaconates	The acid is soluble in water, in alcohol, and in ether, in which the salts are in general soluble.
—	Kinates, or Quinates ..	Most of the metallic quinates are soluble in water, but insoluble in absolute alcohol.
$C_3H_6O_3$	Lactic acid	Very soluble in water; soluble in alcohol and in ether.
—	Lactates..	Most of the lactates are difficultly soluble in cold water and in alcohol; a few of them are soluble in hot alcohol; but in general boiling water dissolves them readily; they are all absolutely insoluble in ether.
$C_{12}H_{24}O_2$	Lauric acid	Soluble in alcohol and in ether.
Pb	Lead	Soluble in dilute nitric acid; feebly attacked by HCl or H_2SO_4.

A DICTIONARY OF THE SOLUBILITIES, &c.—*continued.*

Formula.	Name.	Solubility.
Mg	Magnesium	Soluble in dilute acids; difficultly soluble in concentrated H_2SO_4. Most of its salts are soluble.
$C_4H_6O_5$	Malic acid	Soluble in water, spirit, and ether.
—	Malates	Most malates are soluble in water; only a few are soluble in alcohol; the latter dissolve in nitric acid.
$C_4H_4O_4$	Maleic acid	Soluble in water, alcohol, ether.
—	Maleates	The metallic maleates, except those of Pb, Ag, and Cu, are generally soluble in water; the alkaline maleates are soluble in water, insoluble in alcohol.
$C_6H_{14}O_6$	Mannite	Soluble in hot water and hot alcohol; insoluble in ether.
—	Margarates	The normal alkaline margarates are soluble in warm water and in warm alcohol; they are almost insoluble in ether. The alkaline earthy and earthy salts are insoluble in water or ether, and many of them are insoluble in alcohol.

A DICTIONARY OF THE SOLUBILITIES, &c.—*continued.*

Formula.	Name.	Solubility.
Hg	Mercury	Insoluble in water; scarcely acted on by HCl (even if hot and concentrated); attacked by warm dilute nitric acid, and by the concentrated acid in the cold.
—	Molybdophosphate of ammonium.	Sparingly soluble in water; soluble in hot solutions of many salts $(NH_4)_2SO_4$, KCl, $MgSO_4$, NaCl, alkalies, &c.). The presence of excess of ammonic molybdate renders it insoluble even in acids.
—	Molybdates	Except the Am. salt, all are insoluble, or difficultly soluble, in water. The alkaline molybdates and magnesic molybdate are soluble.
—	Naphtha (mineral) ..	Insoluble in water; soluble in alcohol, ether, or oils.
$C_{10}H_8$	Naphthalin	Insoluble in water; soluble in alcohol, ether, CS_2, &c.
$C_{10}H_{14}N_2$	Nicotin	Soluble in all proportions in water, alcohol, or ether; it forms salts generally soluble in water and in alcohol, insoluble in ether.

A DICTIONARY OF THE SOLUBILITIES, &c.—*continued.*

Formula.	Name.	Solubility.
—	Nitrates	All nitrates, except some basic salts, are soluble in water. The following are among those soluble in alcohol:—Nitrates of Al, Am, Cd, Co, Cu, Be, Ca, Li, Mg, Mn, Ag, Ur, Zn. The following are insoluble in absolute alcohol:—Nitrates of Pb, Ni, K, Na, Sr.
—	Nitrites	All the normal nitrites, except nitrite of silver, are soluble in water, but as a rule less soluble than the nitrates.
N_2	Nitrogen	Nearly insoluble in all known solvents.
$C_6H_5NO_2$	Nitrobenzene..	Almost insoluble in water; soluble in alcohol and ether; soluble in warm concentrated nitric and sulphuric acids.
—	Nitroprussides	The following are soluble:—The acid, nitroprussides of Am, Ba, Ca, Pb, K, Na. The following are insoluble:—Nitroprussides of Cu, Ni, Co, Fe′, Ag, Zn (in cold).
$C_{18}H_{34}O_2$	Oleic acid	Insoluble in water; soluble in alcohol, ether, oils, and creosote.

A DICTIONARY OF THE SOLUBILITIES, &c.—*continued.*

Formula.	Name.	Solubility.
—	Oleates	The normal alkaline oleates are soluble in water, but the other metallic oleates, and the acid salts of the alkalies, are insoluble. As a general rule the oleates are soluble in cold absolute alcohol, and ether.
$C_2H_2O_4+2Aq$	Oxalic acid	Soluble in water and in alcohol; difficultly soluble in ether All its salts are soluble in acids.
$Al_2C_6O_{12}$	Oxalate of aluminium ..	Insoluble in water; slightly soluble in alcohol; soluble in dilute acids.
$(NH_4)_2C_2O_4+Aq$	" ammonium	Soluble in water; insoluble in alcohol.
—	" aniline ..	Soluble in water; difficultly soluble in alcohol; insoluble in ether.
BaC_2O_4+Aq	" barium ..	Sparingly soluble in water; insoluble in alcohol or ether
$Bi_2C_6O_{12}+15Aq$	" bismuth ..	Insoluble in water; soluble in oxalic acid and other acids.
CdC_2O_4+2Aq	" cadmium ..	Insoluble in water, alcohol, or ether; soluble in ammonia and in acids.
$Cr_2C_6O_{12}$	" chromium ..	Soluble in water.
CoC_2O_4+2Aq	" cobalt	Insoluble in water; soluble in ammonia and in ammonium salts.

A DICTIONARY OF THE SOLUBILITIES, &c.—*continued.*

Formula.	Name.	Solubility.
—	Oxalate of copper (ous)	Soluble in ammonia and in ammonium carbonate.
CuC_2O_4+Aq	„ „	Insoluble in water; soluble in ammonia and in some ammonium salts.
$FeC_2O_4+2Aq.$	„ iron (ous) ..	Insoluble in water.
$Fe_2C_6O_{12}$	„ „ (ic) ..	Insoluble in water, soluble in oxalic acid, and in other acids.
PbC_2O_4	„ lead	Insoluble in water, in alcohol, and in hot oxalic acid.
CaC_2O_4	„ calcium ..	Insoluble in water, in oxalic and acetic acids; soluble in other acids.
$Li_2C_2O_4$	„ lithium ..	Soluble in water; insoluble in alcohol.
MgC_2O_4+2Aq	„ magnesium	Very sparingly soluble in water and in alcohol.
MnC_2O_4	„ manganese..	Insoluble in water, alcohol, or ether; soluble in the mineral acids and in some ammonium salts.
$Hg_2C_2O_4+Aq$	„ mercury (ous)	Insoluble in water, alcohol, or ether; sparingly soluble in ammonium salts.
HgC_2O_4+Aq	„ „ (ic)	Insoluble in water, alcohol, or ether; soluble in ammonium salts.
NiC_2O_4+2Aq	„ nickel	Insoluble in water; soluble in ammonia and in ammonium salts.
$C_{10}H_{14}N_2 \cdot H_2C_2O_4$	„ nicotine ..	Soluble in water and in alcohol; insoluble in ether.

A DICTIONARY OF THE SOLUBILITIES, &c.—*continued.*

Formula.	Name.	Solubility.
$K_2C_2O_4 + Aq$	Oxalate of potassium ..	Soluble in water; insoluble in alcohol.
$KHC_2O_4 + Aq$	" potassium (acid).	
$2C_{20}H_{24}N_2O_2 \cdot H_2C_2O_4$	" quinine ..	Nearly insoluble in water; soluble in hot alcohol.
$Na_2C_2O_4$	" sodium ..	Very difficultly soluble in water; insoluble in alcohol or ether.
SrC_2O_4	" strontium ..	Insoluble in water; moderately soluble in ammonium salts.
SnC_2O_4	" tin (ous) ..	Very sparingly soluble in water and in cold dilute acids; soluble in caustic potash.
$ZnC_2O_4 + 2Aq$	" zinc	Insoluble in water; soluble in acids, in ammonia, and sparingly soluble in ammonium salts.
Al_2O_3	Oxide of aluminium ..	Corundum is unacted upon by acids. The ignited oxide is not soluble in dilute acids, but soluble in warm fuming HCl.
$Al_2O_3, 2Aq$		Soluble form. The solution is coagulated by mineral acids and by most organic acids, also by many salts.
$Al_2O_3, 3Aq$		Insoluble in water; soluble in potassic and sodic hydrates; slightly soluble in ammonia, especially in the absence of ammonium salts.

A DICTIONARY OF THE SOLUBILITIES, &c.—*continued.*

Formula.	Name.	Solubility.
Sb_2O_3	Oxide of antimony ..	Sparingly soluble in water, best in boiling; soluble in cold solutions of $(NH_4)Cl$, $(NH_4)NO_3$; soluble in tartaric and acetic acids and in HCl; insoluble in nitric acid; insoluble in dilute, but soluble in concentrated, alkaline solutions. The hydrate is soluble in dilute alkaline solutions.
BaO	„ barium	Sparingly soluble in water. Sp. Gr. — Per cent. of BaO. 1·6 .. .. 30 1·3 .. .. 19 1·03 .. .. 2·6 1·02 .. .. 1·8 1·01 .. .. ·9 Soluble in alcohol; insoluble in ether.
BaH_2O_2+8Aq		The hydrate is very soluble, especially in hot water. Most of the salts of barium are insoluble; but all, except the sulphate, are soluble in dilute HCl and HNO_3.

A DICTIONARY OF THE SOLUBILITIES, &c.—*continued.*

Formula.	Name.	Solubility.
Bi_2O_3	Oxide of bismuth	Insoluble in water; easily soluble in those acids with which it forms soluble salts. Most of its salts are decomposed by water with precipitation of an insoluble basic salt, which is, however, soluble in HNO_3 or HCl.
CdO	" cadmium ..	Insoluble in water; very soluble in ammonia. The cadmium salts are for the most part soluble in water; the insoluble salts dissolve in dilute acids.
CaO	" calcium	Soluble in about 750 parts of water at ordinary temperature; less soluble in hot than in cold water; nearly insoluble in alcohol; insoluble in ether; soluble in sugar solution and in glycerine.
Cr_2O_3	" chromium ..	Insoluble in water; insoluble in HCl after strong ignition.
$Cr_2H_6O_6$		The hydrate is insoluble in water, soluble in caustic alkalies, but separated on boiling. When well washed it is insoluble in ammonia.

A DICTIONARY OF THE SOLUBILITIES, &c.—*continued.*

Formula.	Name.	Solubility.
CoO	Oxide of cobalt	Insoluble in water; soluble in acids; soluble in NH_4Cl (?)
CoH_2O_2		The hydrate is insoluble in water and in caustic alkalies; soluble in ammonia and in some ammonia salts.
—	Co_3O_4, Co_2O_3, Co_3O_5, $Co_{12}O_{19}$.	Co_3O_4 is insoluble in water and in HCl; soluble in H_2SO_4. Co_3O_5 and $Co_{12}O_{19}$ when hydrated are soluble in dilute HCl with evolution of Cl; Co_2O_3 (anhydrous) is soluble in boiling concentrated HCl.
Cu_2O	Oxide of copper (ous) ..	Insoluble in water; soluble in acids.
CuO	„ „ (ic) ..	„ „ „ The hydrate is soluble in acids, in ammonia, and in ammonium salts.
Au_2O	„ gold (ous) ..	When dried the hydrate is insoluble in water; the hydrate sometimes dissolves; soluble in aqua regia.
Au_2O_3	„ „ (ic) ..	Insoluble in water and in most acids; soluble in HCl and in aqua regia; when precipitated it is soluble in boiling alkalies.

A DICTIONARY OF THE SOLUBILITIES, &c.—*continued.*

Formula.	Name.	Solubility.
FeO	Oxide of iron (ous) ..	Insoluble in water; soluble in acids, but with difficulty, after ignition. The hydrate is soluble in ammonia, $(NH_4)Cl$, and $(NH_4)NO_3$.
Fe_2O_3	" " (ic) ..	After ignition it is difficultly soluble in acids, but most freely in HCl. The hydrate is nearly insoluble in caustic alkalies and in ammonia or ammonium salts.
PbO	lead	Not entirely insoluble in water; soluble in acids—best in nitric and acetic acids; soluble in glycerine to some extent, in warm solutions of $(NH_4)Cl$ or $(NH_4)NO_3$; and in hot caustic alkalies; soluble in sugar.
Pb_2O_3	" "	Insoluble in water; dilute acids dissolve out PbO.
PbO_2	" " (per) ..	Insoluble in water; decomposed by cold, HCl; insoluble in moderately strong nitric, sulphuric, or acetic acids.
Li_2O	" lithium	Soluble in water, but to a less extent than potash and soda; sparingly soluble in alcohol.

A DICTIONARY OF THE SOLUBILITIES, &c.—*continued.*

Formula.	Name.	Solubility.
MgO	Oxide of magnesium ..	Nearly insoluble in water. The hydrate is soluble in ammonia water, but not in potash.
MnO	„ manganese ..	Oxides on exposure to air. Insoluble in water; easily soluble in acids; soluble in a boiling solution of NH_4Cl.
—	Mn_2O_3, Mn_3O_4, MnO_2	The oxides dissolve in HCl on heating with evolution of Cl.
Hg_2O	Oxide of mercury (ous)	Insoluble in water, alcohol, or ether; insoluble in dilute HCl or dilute HNO_3; soluble in $(NH_4)Cl$.
HgO	„ „ (ic) ..	Insoluble in water. The hydrate is insoluble in water and in ammonia.
NiO	„ nickel	Insoluble in water; slowly soluble in acids, even after ignition. The hydrate is insoluble in water, but soluble in acids, ammonia, or ammonium carbonate, also in boiling $(NH_4)Cl$.
—	Ni_2O_3, Ni_3O_5	Ni_2O_3 is not known in the hydrated state, it is soluble in acids and in ammonia with reduction to protoxide. Ni_3O_5 is unstable, and dissolves in acids with evolution of Cl.

A DICTIONARY OF THE SOLUBILITIES, &c.—*continued.*

Formula.	Name.	Solubility.
PtO	Oxide of platinum (ous)	Soluble in sulphurous and in concentrated sulphuric acids, also in cold HCl.
K_2O	" potassium ..	Soluble in water. The hydrate is soluble in water and in alcohol; sparingly soluble in ether. The compounds of K are in general less soluble than those of Na.
Ag_2O	" silver	Slightly soluble in water; soluble in ammonia and in alkaline hyposulphites, chlorides, and cyanides; soluble in nitric acid.
Na_2O	" sodium	Soluble in water. The hydrate is soluble in water and in alcohol, and sparingly soluble in ether.
SrO	" strontium ..	Sparingly soluble in water; very sparingly soluble in alcohol; and insoluble in ether. The hydrate is also soluble in water.
SnO	" tin (ous).. ..	Insoluble in water; soluble in acids; insoluble in dilute alkaline solutions. The hydrate is soluble in dilute alkalies, but insoluble in ammonia.
SnO_2	" tin (ic)	Insoluble in water, acids, or alkalies. The ordinary hydrate is soluble in acids and in alkalies. Metastannic acid is insoluble or sparingly soluble in acids.

A DICTIONARY OF THE SOLUBILITIES, &c.—*continued.*

Formula.	Name.	Solubility.
ZnO	Oxide of zinc..	Insoluble in water; soluble in acids even after ignition. The hydrate is soluble in alkalies and in ammonia.
—	Oxychlorides..	Are in general insoluble in water.
—	Oxybromides and oxy-iodides.	Many of them are insoluble in water.
—	Paratartrates	Paratartrates of Am, Cr, Co (sparingly), Cu′, Cu″, Fe′ Fe^{IV}, Mg (sparingly), Ni (sparingly), K, Na are soluble in water. The salts of Ba, Cd, Pb, Ca, Ag, Sr, Zn are insoluble. Many of the latter are sparingly soluble in boiling water, and many of those soluble in water are insoluble in alcohol.
—	Perchlorates	Potassium perchlorate is the least soluble; it is soluble in 15 parts of water at 15° C.
—	Periodates	These are for the most part insoluble in water; the salts of the alkalies are soluble.
C_6H_5HO	Phenic acid (carbolic acid).	Soluble in alcohol, ether, &c.; sparingly soluble in water. It forms salts with the alkalies and alkaline earths soluble in water.

A DICTIONARY OF THE SOLUBILITIES, &c.—*continued.*

Formula.	Name.	Solubility.
—	Phosphoric acids:	
HPO_3	Metaphosphoric acid (and its salts).	Soluble in water, especially when free from earthy impurities. The salts it forms with the alkalies are soluble, those with the alkaline earths and metallic oxides are, for the most part, precipitates.
$H_4P_2O_7$	Pyrophosphoric acid (and its salts).	Soluble in water. The alkaline pyrophosphates are soluble in water; most of the other salts are precipitates, but soluble in solutions of alkaline pyrophosphates.
H_3PO_4	Orthophosphoric acid ..	Soluble in water and in alcohol.
$Al_2P_2O_8$	Phosphate of aluminum	Insoluble in water or in $(NH_4)Cl$; soluble in acids, even in acetic (?) and in caustic potash, not precipitated by ammonia in presence of citric acid.
$H(NH_4)_2PO_4$	„ ammonium	Soluble in water; insoluble in alcohol.
—	$(NH_4)_3PO_4$ and $H_2(NH_4)PO_4$.	These salts are soluble in water.
—	Phosphate of antimony	Insoluble in cold, decomposed by boiling water.
$BaHPO_4$	„ barium (ordinary).	Very sparingly soluble in water; soluble in $(NH_4)Cl$, and in dilute HCl, H_3PO_4, HNO_3.

A DICTIONARY OF THE SOLUBILITIES, &c.—*continued.*

Formula.	Name.	Solubility.
$Cd_3P_2O_8$	Phosphate of cadmium	Insoluble in water ; soluble in cold $(NH_4)Cl$.
—	Phosphates of calcium :	
$CaH_4P_2O_8$	mono-	Soluble in water, precipitated with decomposition by alcohol.
$Ca_2H_2P_2O_8 + 4Aq$	di-	Insoluble in water and in alcohol; nearly insoluble in acetic, but soluble in nitric and hydrochloric acids.
$Ca_3P_2O_8$	tri-	Insoluble in water, alcohol, ether. Easily soluble in nitric and hydrochloric acids; less easily in acetic acid.
$Cr_2P_2O_8$	Phosphate of chromium	Insoluble in water ; easily soluble in acids.
$Co_3P_2O_8+8Aq$	„ cobalt ..	Insoluble in water; soluble in acids and in ammonia.
$CuHPO_4$	„ copper ..	Insoluble in water; soluble in acids, even in acetic.
$Fe_2P_2O_8$	„ iron (ic)	Insoluble in water; nearly insoluble in acetic acid; slightly soluble in a solution of CO_2. Soluble in acids, but reprecipitated by alkalies, alkaline, carbonates, and acetates.
$Pb_3P_2O_8$	„ lead	Insoluble in water, acetic acid, or ammonia; soluble in nitric acid.

A DICTIONARY OF THE SOLUBILITIES, &C.—*continued.*

Formula.	Name.	Solubility.
$PbHPO_4$	Phosphate of lead ..	Insoluble in water or acetic acid; soluble in nitric acid and in potash or soda.
LiH_2PO_4	" lithium ..	Soluble in water.
Li_3PO_4	" " ..	Sparingly soluble (1 in 833 at 12°) in water; soluble in water containing CO_2 and in very dilute acids.
—	" magnesium	
$H_4MgP_2O_8$	mono-	Soluble in water; tolerably soluble in spirit.
$MgHPO_4+7Aq$	di-	Soluble in water, and with more facility in dilute acids, even in acetic acid; insoluble in alcohol.
$Mg_3P_2O_8$	tri-	Insoluble in water; difficultly soluble in acetic; soluble in dilute acids.
$(NH_4)_2Mg_2P_2O_8 + 12Aq$	Phosphate of magnesium and ammonium.	Very sparingly soluble in water; a little more soluble in presence of $(NH_4)Cl$; nearly insoluble in presence of ammonia.
—	Phosphate of manganese	
$MnHPO_4+3Aq$	di-	Difficultly soluble in water or acetic acid; insoluble in alcohol.
$Mn_3P_2O_8+7Aq$	tri-	Sparingly soluble in water; insoluble in alcohol; soluble in some ammonium salts and in acids.

A DICTIONARY OF THE SOLUBILITIES, &C.—*continued.*

Formula.	Name.	Solubility.
$Hg_6P_2O_8$	Phosphate of mercury (ous).	Insoluble in water, decomposed by HCl.
$Hg_3P_2O_8$	Phosphate of mercury (ic).	Insoluble in water; soluble in ammonium salts and in acids, including phosphoric.
$Ni_3P_2O_8+7Aq$	Phosphate of nickel ..	Insoluble in water; soluble in sulphuric, nitric, hydrochloric, and phosphoric acids.
—	,, potassium:	
H_2KPO_4	mono-	Soluble in water; insoluble in alcohol.
HK_2PO_4	di-	Soluble in water and in alcohol.
K_3PO_4	tri-	Soluble in water; insoluble in alcohol.
—	Phosphate of silver:	
HAg_2PO_4	di-	Decomposed by water; insoluble in absolute alcohol or ether; soluble in phosphoric acid.
Ag_3PO_4	tri-	Insoluble in water; soluble in nitric and phosphoric acids, also in acetic acid; soluble in ammonia, ammonium chloride, alkaline hyposulphites.
	Phosphate of sodium:	
NaH_2PO_4+Aq	mono-	Soluble in water; nearly insoluble in alcohol.
Na_2HPO_4+12Aq	di-	Soluble in water; insoluble in alcohol.
Na_3Po_4+12Aq	tri-	Soluble in water.

A DICTIONARY OF THE SOLUBILITIES, &c.—*continued.*

Formula.	Name.	Solubility.
$SrHPO_4$	Phosphate of strontium	Insoluble in water; soluble in water containing ammonium salts or free acids.
$Sn_3P_2O_8$	„ tin (ous)	Insoluble in water; soluble in mineral acids, in $(NH_4)Cl$ and in caustic potash.
$2SnO_2, P_2O_5, 10Aq$	„ „ (ic) ..	Insoluble in nitric acid.
$(U_2O_2)_2H_2P_2O_8 + xAq$	„ uranium ..	Insoluble in water or acetic acid; soluble in mineral acids.
$Zn_3P_2O_8, 2Aq$	„ zinc ..	Insoluble in water; soluble in acids, in ammonia, in some ammonium salts, and in potash.
P_4	Phosphorus	Ordinary phosphorus is insoluble in water, slightly soluble in alcohol, more soluble in ether, freely soluble in CS_2 and in SCl_2. Amorphous phosphorus is insoluble in water, alcohol, ether, CS_2; very soluble in strong nitric acid.
$C_{20}H_{24}N_2O_2$	Quinine	Slightly soluble in water; soluble in alcohol and ether, also in chloroform; soluble in dilute acids.
—	Silicates	Artificial silica (ignited) is soluble in alkalies. Artificial silicates are decomposed by acids, of natural silicates some are decomposed by acids and some unacted upon. The latter are decomposed by HFl.

A DICTIONARY OF THE SOLUBILITIES, &c.—*continued.*

Formula.	Name.	Solubility.
Ag	Silver	Unacted upon by water and by vegetable acids. Slightly attacked by boiling hydrochloric acid; soluble in nitric acid and in hydriodic acid.
$C_{18}H_{30}O_{15}$	Starch	Insoluble in cold water, alcohol, or ether. It forms a kind of solution in hot water.
$C_{18}H_{36}O_2$	Stearic acid	Insoluble in water; soluble in alcohol and in ether, benzine, and CS_2.
—	Stearates..	The normal alkaline stearates are soluble in small quantities of pure water, but decomposed by larger portions. All other stearates are insoluble in water. All of them are insoluble in ether, and all, except those of the alkalies, are insoluble in alcohol.
$C_{21}H_{22}N_2O_{21}$	Strychnine	Almost insoluble in water; sparingly soluble in alcohol; insoluble in ether; soluble in acids. Most of its salts are soluble in water.
C_8H_8	Styrol	Slightly soluble in water; soluble in alcohol and in ether.
—	Suberates	The acid is sparingly soluble in cold, more soluble in hot, water; soluble in alcohol, ether, fatty and volatile oils. The alkaline suberates and those of the alkaline earths are soluble in water.

A DICTIONARY OF THE SOLUBILITIES, &C.—*continued.*

Formula.	Name.	Solubility.
—	Succinates	The acid is soluble in water, in alcohol, and in ether. Most succinates are soluble in water; all are soluble in potassic acetate.
$C_{12}H_{22}O_{11}$	Sugar (cane)	Soluble in water and in alcohol (sparingly); insoluble in ether.
H_2SO_4	Sulphuric acid	Soluble in water. (See Tables.)
$Al_2(SO_4)_3+18Aq$	Sulphate of aluminium	Soluble in water; insoluble in alcohol.
$(NH_4)_2SO_4$	" ammonium	Soluble in water; sparingly soluble in absolute alcohol; more soluble in dilute alcohol.
$(NH_2C_6H_5)HSO_4$	" anilin ..	Very soluble in water; soluble in alcohol; insoluble in ether.
$BaSO_4$	" barium ..	Insoluble in water; a little soluble in cold dilute acids; boiling hydrochloric acid dissolves a considerable amount of it. Insoluble in alcohol and in ether.
$CdSO_4+4Aq$	" cadmium ..	Soluble in water.
$CaSO_4$	" calcium ..	Slightly soluble in water; insoluble in water at 140–150° C. More soluble in presence of NaCl and some other salts than in water.
$Cr_2(SO_4)_3+15Aq$	" chromium ..	Soluble in water; less soluble in spirit.
$CoSO_4$	" cobalt	Difficultly soluble in cold, more soluble in hot, water; insoluble in alcohol.

A DICTIONARY OF THE SOLUBILITIES, &c.—*continued.*

Formula.	Name.	Solubility.
Cu_2SO_4	Sulphate of copper (ous)	Insoluble in water or in concentrated sulphuric acid.
$CuSO_4+5Aq$	" " (ic)	Soluble in water; soluble in dilute alcohol. (See Solubility Tables.)
$FeSO_4+7Aq$	" iron (ous) ..	Soluble in water. (See Tables.)
$Fe_2(SO_4)_3$	" " (ic) ..	Soluble in water; soluble in alcohol.
$PbSO_4$	" lead	Insoluble in water; more soluble in presence of ammonium salts; insoluble in alcohol; soluble in hot concentrated hydrochloric acid and in nitric acid if warm and concentrated; soluble in hot potash or soda-lye, and in warm ammonia; sparingly soluble in strong sulphuric acid, precipitated on dilution.
Li_2SO_4+Aq	" lithium ..	Soluble in water; sparingly (?) soluble in alcohol.
$MgSO_4+7Aq$	" magnesium	Soluble in water; insoluble in alcohol.
$MnSO_4$	" manganese (ous).	Soluble in water; insoluble in alcohol and in ether.
$Mn_2(SO_4)_3$	" manganese (ic).	Decomposed by water, by dilute acids, and by alcohol.
Hg_2SO_4	" of mercury (ous).	Sparingly soluble in water.

A Dictionary of the Solubilities, &c.—*continued.*

Formula.	Name.	Solubility.
$HgSO_4$	Sulphate of mercury (ic)	Decomposed by water.
$NiSO_4+7Aq$	,, nickel ..	Soluble in water; insoluble in alcohol or ether.
K_2SO_4	,, potassium ..	Soluble in water; insoluble in absolute alcohol. Sp. Gr. 12·5 C. — K_2SO_4 per cent. — Sp. Gr. 12·5 C. — K_2SO_4 per cent. 1·00795 .. .. 1 — 1·05240 .. .. 7 1·03050 .. .. 4 — 1·07350 10
$2C_{20}H_{24}N_2O_2 . H_2SO_4$	,, quinine (normal).	Soluble in water; soluble in hot alcohol; soluble in glycerine; very soluble in dilute sulphuric acid.
Ag_2SO_4	,, silver.. ..	Sparingly soluble in water; insoluble in alcohol; soluble in dilute acids to a greater extent than in water.
Na_2SO_4	,, sodium ..	Soluble in water (see Tables); soluble in glycerine; very sparingly soluble in alcohol.
$SrSO_4$	,, strontium ..	Insoluble in water (more soluble than $BaSO_4$), almost absolutely insoluble in alcohol.
$ZnSO_4$	,, zinc	Soluble in water; insoluble in alcohol.
Al_2S_3	Sulphide of aluminium	Decomposed by water.
$(NH_4)_2S$	,, ammonium	Soluble in water.

A DICTIONARY OF THE SOLUBILITIES, &c.—*continued.*

Formula.	Name.	Solubility.
Sb_2S_3	Sulphide of antimony (precipitated).	Insoluble in water or dilute acids; soluble in concentrated acids and in caustic alkalies, and in alkaline sulphides.
Sb_2S_3	Sulphide of arsenic (precipitated).	Sparingly soluble in hot water (?); insoluble in acids; soluble in aqua regia and in caustic alkalies and alkaline sulphides.
BaS	Sulphide of barium ..	Soluble in water with decomposition.
Bi_2S_3	" bismuth ..	Insoluble in water, dilute acids, solutions of alkalies, alkaline sulphides, or cyanide of potassium.
CdS	" cadmium ..	Insoluble in water, dilute acids, alkalies, alkaline sulphides, or cyanide of potassium; soluble in concentrated HCl or HNO_3.
CaS	" calcium ..	Insoluble in water; calcic hydric sulphide is soluble.
Cr_2S_3	" chromium ..	Insoluble in water; soluble in nitric acid, and more easily in aqua regia; insoluble in caustic potash or in potassic sulphide.
CoS	" cobalt	Obtained by precipitation; it is insoluble in water and in caustic or carbonated alkalies; sparingly soluble in dilute mineral acids; more readily soluble in strong acids; soluble in aqua regia.

A DICTIONARY OF THE SOLUBILITIES, &C.—*continued.*

Formula.	Name.	Solubility.
Cu_2S	Sulphide of copper (ous)	Insoluble in solution of ammonium sulphide; difficultly soluble in strong boiling hydrochloric and nitric acids.
CuS	„ „ (ic)	Insoluble in water; slightly soluble in ammonium sulphide; insoluble in caustic alkalies or in alkaline sulphides; soluble in strong hydrochloric and nitric acids and in aqua regia; soluble, with decomposition, in solution of potassium cyanide.
Au_2S_3	„ gold	Insoluble in water or hydrochloric or nitric acid; soluble in aqua regia; soluble in yellow sulphide of ammonium, in caustic alkalies, and in alkaline sulphides.
FeS	„ iron	Insoluble or slightly soluble in water; insoluble in ammonium sulphide; soluble in cold dilute mineral acids.
PbS	„ lead	Insoluble in water, dilute acids, solutions of alkalies, or of alkaline sulphides; soluble in hot concentrated hydrochloric or nitric acid.
Li_2S	„ lithium ..	Soluble in water.
MgS	„ magnesium	Very sparingly soluble in cold water; soluble in acids with decomposition.

A DICTIONARY OF THE SOLUBILITIES, &c.—*continued.*

Formula.	Name.	Solubility.
MnS	Sulphide of manganese	Insoluble in water or in ammonium sulphide; soluble in dilute acids, even in acetic.
Hg_2S	" mercury (ous).	Insoluble in cold water or dilute nitric acid, or in hot solutions of caustic ammonia, or of ammonium sulphide.
HgS	" mercury (ic)	Obtained by precipitation; it is insoluble in water and in hot acids; soluble in aqua regia; insoluble in caustic alkalies, in potassium cyanide, and in ammonium sulphide.
NiS	" nickel ..	Insoluble in water; sparingly soluble in ammonia and in a mixture of ammonia and ammonium sulphide; insoluble in dilute mineral acids, soluble in aqua regia.
K_2S	" potassium ..	Soluble in water and in alcohol.
Ag_2S	" silver	Insoluble in water, dilute acids, caustic alkalies or alkaline sulphides; soluble in aqua regia.
Na_2S	" sodium ..	Soluble in water; insoluble in alcohol or ether.
SrS	" strontium ..	Soluble in water, with decomposition.
SnS	" tin (ous) ..	Insoluble in water or dilute acids; soluble in the stronger acids, and in solutions of yellow ammonium or potassium sulphide.

A DICTIONARY OF THE SOLUBILITIES, &c.—*continued.*

Formula.	Name.	Solubility.
SnS_2	Sulphide of tin (ic) ..	Insoluble in water; soluble in caustic alkalies, and in alkaline sulphides; also in hot, strong hydrochloric acid.
ZnS	" zinc	Insoluble in water, in caustic alkalies or alkaline sulphides; soluble in dilute acids.
$(NH_4)_2SO_3$	Sulphite of ammonia ..	Soluble in water; sparingly soluble in absolute alcohol.
$BaSO_3$	" barium ..	Scarcely at all soluble in water; soluble in sulphurous acid.
$CdSO_3$	" cadmium ..	Difficultly soluble in water; insoluble in alcohol.
$CaSO_3$	" calcium ..	Slightly soluble in water; soluble in sulphurous acid.
$CdSO_3$	" cobalt ..	Almost insoluble in water; insoluble in alcohol.
$PbSO_3$	" lead	Insoluble in water; sparingly soluble in sulphurous acid.
Li_2SO_3+6Aq	" lithium ..	Soluble in water; insoluble in alcohol.
$MgSO_3$	" magnesium	Difficultly soluble in water; insoluble in alcohol; soluble in sulphurous acid.
$MnSO_3$	" manganese	Insoluble in water, alcohol, or ether; soluble in sulphurous acid.
$NiSO_3+6Aq$	" nickel.. ..	Insoluble in water; soluble in sulphurous acid.

A DICTIONARY OF THE SOLUBILITIES, &C.—*continued.*

Formula.	Name.	Solubility.
$K_2SO_3 + 2Aq$	Sulphite of potassium ..	Soluble in water; very sparingly soluble in alcohol.
Ag_2SO_3	" silver	Very slightly soluble in water; almost insoluble in sulphurous acid.
$Na_2SO_3 + 7Aq$	" sodium ..	Soluble in water; insoluble in alcohol.
$SrSO_3$	" strontium ..	Scarcely at all soluble in water; soluble in sulphurous acid.
$ZnSO_3$	" zinc	Sparingly soluble in water; insoluble in alcohol.
—	Sulphocyanides	The following are soluble in water: sulphocyanides of allyl (spar.), Al, Ba, Ca, Co, Cu (spar.), Fe^{IV}, Mg, Mn, Ni, K, Na, Sr, Ur, Zn, Sn. These are insoluble: sulphocyanides of Ag, Hg′, Cu′, amyl, Bi, Cd, ethyl, Pb, methyl.
S_2	Sulphur (ordinary) ..	Insoluble in water; slightly soluble in alcohol, ether, benzine, oil of turpentine, and in general in the fatty and essential oils, especially when these liquids are warm; soluble in CS_2.
—	Sulphydrates..	The following are soluble: sulphydrates of Am, Ba, Ca, K, Na, Sr.

A DICTIONARY OF THE SOLUBILITIES, &c.—*continued.*

Formula.	Name.	Solubility.
$C_4H_6O_6$	Tartaric acid	Soluble in water; soluble in alcohol; insoluble in ether or in oil of turpentine.
—	Tartrates	The normal tartrates, excepting those of the alkalies, are but sparingly soluble or insoluble in water; the acid salts, on the other hand, are mostly soluble, except those of the alkalies. All the metallic tartrates which are insoluble in water are soluble in hydrochloric and nitric acids, and, excepting those of silver and mercury, in caustic alkalies; also in ammonia, excepting tartrate of mercury.
$C_7H_8N_4O_2$	Theobromin	Sparingly soluble in boiling water, and still less soluble in alcohol and ether; easily soluble in ammonia, acetic acid, and caustic alkalies.
—	Titanic acid	Ignited (TiO_2); insoluble in water, acids (excepting HF), or solutions of caustic or carbonated alkalies.
—		Hydrated; insoluble in water; soluble in acids; slightly soluble in alkaline carbonates.

A DICTIONARY OF THE SOLUBILITIES, &c.—*continued.*

Formula.	Name.	Solubility.
—	Tungstates	The alkaline tungstates are soluble in water, but all the others, with the exception of the Mg salt, appear to be insoluble in water.
—	Urates	The acid is insoluble in water, alcohol, ether; the urates of the fixed alkalies and alkaline earths are difficultly soluble in cold, more easily soluble in hot, water; those of the other metallic oxides, and the ammonium salt, are insoluble. All the urates are decomposed by acids, even by acetic acid.
—	Vanadiates	Most of the bivanadiates are readily soluble in water, the other vanadiates are but sparingly soluble in water, and insoluble in alcohol.
—	Wax	Waxes are insoluble in water, rather difficultly soluble in alcohol and in alkaline solutions. Easily soluble in ether and oils; soluble in benzin or chloroform, and in oils both fixed and essential.
Zn	Zinc..	Easily soluble in dilute hydrochloric, nitric or sulphuric acids.

SPECIFIC GRAVITY.

DETERMINATION OF SPECIFIC GRAVITY.

Solids.

1. Solids heavier than, and insoluble in, water.

a. By weighing in air and water.

$$\text{Sp. gr.} = \frac{(\text{weight in air})}{(\text{loss of weight in water})}.$$

b. By Nicholson's hydrometer.

Let w_1 be the weight required to sink the instrument to the mark on the stem, the weight of the instrument being W; to take the specific gravity of any solid substance, place a portion of it weighing less than w_1 in the upper pan, with such additional weight, say w_3, as will cause the instrument to sink to the zero mark. The weight of the substance is then $w_1 - w_3$. Next transfer the substance to the lower pan, and again adjust with weight w_4 to the zero mark.

$$\text{Sp. gr.} = \frac{w_1 - w_3}{w_4 - w_3}.$$

c. By the specific gravity bottle (applicable to powders).

Weigh the flask filled to the mark with water, then place the substance, of known weight, in the flask, fill to the mark with water, and weigh again.

$$\text{Sp. gr.} = \frac{(\text{weight of substance in air}) + (\text{weight of flask and water}) - (\text{weight of flask and water and substance})}{(\text{weight of substance in air})}.$$

2. Solids lighter than, and insoluble in, water.

The solid is weighted by a piece of lead of known specific gravity, and weighed in water.

$$\text{Sp. gr.} = \frac{(\text{weight of substance in air})}{(\text{weight of lead in water}) - (\text{weight of lead and substance in water}) + (\text{weight of substance in air})}.$$

3. Solids heavier than, and soluble in, water.

Proceed as in 1 *a*, using instead of water some liquid without action on the solid.

$$(\text{weight of bulk of liquid equal to substance}) = (\text{weight of substance in air}) - (\text{weight of substance in liquid}).$$

$$(\text{weight of bulk of water equal to substance}) = \frac{(\text{weight of bulk of liquid equal to substance}) \times (\text{sp. gr. of water})}{(\text{sp. gr. of liquid})}.$$

$$\text{Sp. gr.} = \frac{(\text{weight of substance in air})}{(\text{weight of bulk of water equal to substance})}.$$

Liquids.

1. By the hydrometer.
2. By the specific gravity bottle.
   Weigh the bottle filled to the mark with water, and again when filled to the mark with liquid.

$$\text{Sp. gr.} = \frac{(\text{weight of liquid and bottle}) - (\text{weight of bottle})}{(\text{weight of water and bottle}) - (\text{weight of bottle})}.$$

Gases.

For the description of the processes used in determining the specific gravity of gases, consult some standard work.

1. The method of Gay-Lussac.
   We first determine the volume (V) occupied by a weight (W) of the substance at the temperature T, under a pressure P. The weight (W_1) of the same volume (V) of air, at the same temperature and pressure, is then found by the following formula:

$$W_1 = \cdot 0012932 \text{ gram} \,.\, V \,.\, \frac{1}{1 + \cdot 00367\,T} \,.\, \frac{P}{760}.$$

$$\text{Sp. gr.} = \frac{W}{W'}.$$

For the Table by which to calculate $\left(\frac{1}{1 + \cdot 00367\,T}\right)$, see page 181.

2. The method of Dumas.

$$\text{Sp. gr.} = \frac{P + Vn_t}{(V - v)\,n_{t'}}.$$

P = the difference in weight between the globe filled with air and filled with vapour.
V = capacity of balloon in cub. cent.
n_t = weight of 1 c. c. of air at the temperature of weighing the balloon filled with air.
$n_{t'}$ = weight of 1 c. c. of air at the temperature of sealing the globe.

For more exact formulæ, see Watts' 'Dictionary,' vol. v. 371, and Brown ('Chem. Soc. J.' [2], iv. 72).

For Tables by which to calculate n_t and $n_{t'}$, see page 179.

TABLE SHOWING THE SPECIFIC GRAVITY OF THE ELEMENTS.

Name.	Specific Gravity.	Observer.
Aluminium (cast)	2·56	Wöhler and Deville.
„ (hammered)	2·67	„ „
Antimony	6·7	Karsten.
„	6·697	Marchand, Scheerer.
Arsenic	5·63	Karsten.
„	5·96	Guibourt.
Barium	4·0	Clarke.
Bismuth (quickly cooled)	7·677	Deville.
„ (slowly cooled) ..	9·935	„
Boron	2·68	Wöhler and Deville.
Bromine	2·966	Balard.
Cadmium	8·45	Kopp.
„ (as foil)	8·69	R. Wagner.
Calcium	1·58	Bunsen.
„	1·6–1·8	Caron.
Carbon (diamond)	3·52	Brisson.
„ (graphite)	2·33	Karsten.
Cerium	5·5	Wöhler.
Chlorine (liquid)	1·38	Faraday.
Chromium	6·2	Wöhler.
„	7·01	Bunsen & Frankland.
Cobalt	8·43–8·9	
„	8·957	Rammelsberg.
Copper (hammered).. ..	8·958	Schröder.
„ (reduced by galvanism).	8·952	„
Glucinum	2·1	Debray.
Gold (cast)..	19·26	Brisson, Matthiessen.
„ (hammered)	19·55–19·6	G. Rose.
Indium	7·36	Winckler.
Iodine	4·948	Gay-Lussac.
Iridium	21·15	Deville and Debray.
Iron	7·79	Karsten.
„ (steel)	7·62–7·81	
Lead	11·33	Kopp.
„	11·39	Karsten.
Lithium	·594	Bunsen.
Magnesium	1·70	Kopp.

TABLE SHOWING THE SPECIFIC GRAVITY, &c.—*continued.*

Name.	Specific Gravity.	Observer.
Magnesium	1·870	Wöhler.
Manganese..	8·03	Bachmann.
Mercury	13·60	Regnault, Kopp.
Molybdenum	8·56	Loughlin.
Nickel	8·4–9·5	
Niobium	6·67–7·37	Hermann, Marignac.
Osmium	21·35	Deville and Debray.
Palladium	11·40	„ „
Phosphorus	1·840	Schrötter.
„ (red)	2·106	„
Platinum (cast)	21·15	Deville and Debray.
Potassium	·865	Gay - Lussac and Thenard.
Rhodium (cast)..	12·1	Deville and Debray.
Rubidium	1·516	Bunsen.
Ruthenium (cast)	11·0–11·4	Deville and Debray.
Selenium (amorphous) ..	4·28	Count Schaffgotsch.
„ (crystalline) ..	4·80	„ „
Silicon..	2·49	Wöhler.
Silver (cast)	10·53	G. Rose.
Sodium	·9722	Gay - Lussac and Thenard.
„	·985	Schröder.
Strontium	2·542	Bunsen.
Sulphur (rhombic)	2·07	Marchand and Scheerer.
„ (amorphous) ..	1·975	„ „
Tantalum	10·78	R. Hermann.
Tellurium	6·180	Löwe.
Thallium (cast)..	11·81	Crookes.
Thorium	7·657–7·795	Chydenius.
Tin	7·29–7·37	
Tungsten	17·1–18·3	Bernouilli, Wöhler.
Uranium	18·4	Peligot.
Vanadium	5·5	Roscoe.
Zinc	7·13	Kopp.
„	7·15	Bolley.
Zirconium	4·15	Troost.

TABLE SHOWING A COMPARISON OF THE DEGREES OF BAUMÉ, CARTIER, AND BECK'S AREOMETERS, WITH SPECIFIC GRAVITY DEGREES.

A.—*For Liquids lighter than Water.*

Degs. of Baumé, Cartier, Beck.	Baumé. Sp. Gr.	Cartier. Sp. Gr.	Beck. Sp. Gr.	Degs. of Baumé, Cartier, Beck.	Baumé. Sp. Gr.	Cartier. Sp. Gr.	Beck. Sp. Gr.
0	..	..	1·000	36	0·848	0·837	0·8252
1	..	..	0·9941	37	0·843	0·831	0·8212
2	..	..	0·9883	38	0·838	0·826	0·8173
3	..	..	0·9826	39	0·833	0·820	0·8133
4	..	..	0·9770	40	0·829	0·815	0·8095
5	..	..	0·9714	41	0·824	0·810	0·8061
6	..	..	0·9659	42	0·819	0·805	0·8018
7	..	..	0·9604	43	0·815	0·800	0·7981
8	..	..	0·9550	44	0·810	..	0·7944
9	..	..	0·9497	45	0·806	..	0·7907
10	1·000	..	0·9444	46	0·801	..	0·7871
11	0·993	1·000	0·9392	47	0·797	..	0·7834
12	0·986	0·992	0·9340	48	0·792	..	0·7799
13	0·979	0·985	0·9289	49	0·788	..	0·7763
14	0·973	0·977	0·9239	50	0·784	..	0·7727
15	0·967	0·969	0·9189	51	0·781	..	0·7692
16	0·960	0·962	0·9139	52	0·776	..	0·7658
17	0·954	0·955	0·9090	53	0·771	..	0·7623
18	0·948	0·948	0·9042	54	0·769	..	0·7589
19	0·942	0·941	0·8994	55	0·763	..	0·7556
20	0·935	0·934	0·8947	56	0·759	..	0·7522
21	0·929	0·927	0·8900	57	0·755	..	0·7489
22	0·924	0·920	0·8854	58	0·751	..	0·7456
23	0·918	0·914	0·8808	59	0·748	..	0·7423
24	0·912	0·908	0·8762	60	0·744	..	0·7391
25	0·906	0·901	0·8717	61	0·740	..	0·7359
26	0·901	0·895	0·8673	62	0·736	..	0·7328
27	0·895	0·889	0·8629	63	..	..	0·7296
28	0·889	0·883	0·8585	64	..	..	0·7265
29	0·884	0·877	0·8542	65	..	..	0·7234
30	0·879	0·871	0·8500	66	..	..	0·7203
31	0·873	0·865	0·8457	67	..	..	0·7173
32	0·868	0·859	0·8415	68	..	..	0·7142
33	0·863	0·853	0·8374	69	..	..	0·7112
34	0·858	0·848	0·8333	70	..	..	0·7083
35	0·853	0·842	0·8292				

TABLE SHOWING COMPARISON OF DEGREES—*continued.*

B.—*For Liquids heavier than Water.*

Degs. of Baumé, Beck.	Baumé. Sp. Gr.	Beck. Sp. Gr.	Degs. of Baumé, Beck.	Baumé. Sp. Gr.	Beck. Sp. Gr.
0	1·000	1·000	37	1·337	1·2782
1	1·007	1·0059	38	1·349	1·2879
2	1·014	1·0119	39	1·361	1·2977
3	1·020	1·0180	40	1·375	1·3077
4	1·028	1·0241	41	1·388	1·3178
5	1·034	1·0303	42	1·401	1·3281
6	1·041	1·0366	43	1·414	1·3386
7	1·049	1·0429	44	1·428	1·3492
8	1·057	1·0494	45	1·442	1·3600
9	1·064	1·0559	46	1·456	1·3710
10	1·072	1·0625	47	1·470	1·3821
11	1·080	1·0692	48	1·485	1·3934
12	1·088	1·0759	49	1·500	1·4050
13	1·096	1·0828	50	1·515	1·4167
14	1·104	1·0897	51	1·531	1·4286
15	1·113	1·0968	52	1·546	1·4407
16	1·121	1·1039	53	1·562	1·4530
17	1·130	1·1111	54	1·578	1·4655
18	1·138	1·1184	55	1·596	1·4783
19	1·147	1·1258	56	1·615	1·4912
20	1·157	1·1333	57	1·634	1·5044
21	1·166	1·1409	58	1·653	1·5179
22	1·176	1·1486	59	1·671	1·5315
23	1·185	1·1565	60	1·690	1·5454
24	1·195	1·1644	61	1·709	1·5596
25	1·205	1·1724	62	1·729	1·5741
26	1·215	1·1806	63	1·750	1·5888
27	1·225	1·1888	64	1·771	1·6038
28	1·235	1·1972	65	1·793	1·6190
29	1·245	1·2057	66	1·815	1·6346
30	1·256	1·2143	67	1·839	1·6505
31	1·267	1·2230	68	1·864	1·6667
32	1·278	1·2319	69	1·885	1·6832
33	1·289	1·2409	70	1·909	1·7000
34	1·300	1·2500	71	1·935	..
35	1·312	1·2593	72	1·960	..
36	1·324	1·2680			

WEIGHT OF ONE C. C. OF AIR AT DIFFERENT TEMPERATURES, FROM 0° C. TO 300° C. AT 760 MM.

Temp. C.	Grams.	Temp. C.	Grams.	Temp. C.	Grams.	Temp. C.	Grams.
0	·001293	38	·001134	76	·001011	114	·000911
1	·001288	39	·001131	77	·001008	115	·000909
2	·001284	40	·001128	78	·001005	116	·000907
3	·001279	41	·001124	79	·001002	117	·000905
4	·001275	42	·001121	80	·001000	118	·000903
5	·001270	43	·001118	81	·000997	119	·000900
6	·001266	44	·001114	82	·000994	120	·000898
7	·001261	45	·001111	83	·000992	121	·000896
8	·001257	46	·001108	84	·000989	122	·000894
9	·001252	47	·001105	85	·000986	123	·000891
10	·001248	48	·001102	86	·000983	124	·000889
11	·001243	49	·001098	87	·000980	125	·000887
12	·001239	50	·001095	88	·000977	126	·000884
13	·001234	51	·001091	89	·000974	127	·000882
14	·001230	52	·001088	90	·000972	128	·000880
15	·001225	53	·001084	91	·000969	129	·000878
16	·001221	54	·001081	92	·000967	130	·000876
17	·001217	55	·001077	93	·000964	131	·000874
18	·001213	56	·001074	94	·000962	132	·000871
19	·001209	57	·001070	95	·000959	133	·000869
20	·001205	58	·001067	96	·000956	134	·000867
21	·001201	59	·001063	97	·000953	135	·000865
22	·001197	60	·001060	98	·000951	136	·000863
23	·001193	61	·001057	99	·000948	137	·000860
24	·001189	62	·001053	100	·000946	138	·000858
25	·001185	63	·001050	101	·000943	139	·000856
26	·001181	64	·001047	102	·000941	140	·000854
27	·001177	65	·001044	103	·000938	141	·000852
28	·001173	66	·001041	104	·000936	142	·000850
29	·001169	67	·001038	105	·000933	143	·000848
30	001165	68	·001035	106	·000931	144	·000846
31	·001161	69	·001032	107	·000928	145	·000844
32	·001157	70	·001029	108	·000926	146	·000842
33	·001154	71	·001026	109	·000923	147	·000840
34	·001150	72	·001023	110	·000921	148	·000838
35	·001146	73	·001020	111	·000919	149	·000836
36	·001142	74	·001017	112	·000916	150	·000834
37	·001138	75	·001014	113	·000914	151	·000832

WEIGHT OF ONE C. C. OF AIR, &c.—*continued.*

Temp. C.	Grams.	Temp. C.	Grams.	Temp. C.	Grams.	Temp. C.	Grams.
152	·000830	190	·000762	227	·000705	264	·000657
153	·000828	191	·000760	228	·000703	265	·000655
154	·000826	192	·000758	229	·000702	266	·000654
155	·000824	193	·000757	230	·000701	267	·000653
156	·000822	194	·000755	231	·000699	268	·000652
157	·000821	195	·000754	232	·000698	269	·000651
158	·000819	196	·000752	233	·000697	270	·000650
159	·000817	197	·000751	234	·000695	271	·000648
160	·000815	198	·000749	235	·000694	272	·000646
161	·000813	199	·000748	236	·000692	273	·000645
162	·000811	200	·000746	237	·000691	274	·000644
163	·000809	201	·000744	238	·000690	275	·000643
164	·000807	202	·000743	239	·000689	276	·000642
165	·000806	203	·000740	240	·000688	277	·000641
166	·000804	204	·000739	241	·000686	278	·000640
167	·000802	205	·000737	242	·000685	279	·000639
168	·000800	206	·000736	243	·000683	280	·000638
169	·000798	207	·000734	244	·000682	281	·000636
170	·000796	208	·000733	245	·000681	282	·000635
171	·000794	209	·000731	246	·000679	283	·000634
172	·000793	210	·000730	247	·000678	284	·000633
173	·000791	211	·000728	248	·000677	285	·000631
174	·000789	212	·000727	249	·000675	286	·000630
175	·000788	213	·000725	250	·000674	287	·000629
176	·000786	214	·000724	251	·000673	288	·000628
177	·000784	215	·000722	252	·000672	289	·000627
178	·000782	216	·000721	253	·000670	290	·000626
179	·000781	217	·000719	254	·000669	291	·000625
180	·000779	218	·000718	255	·000668	292	·000624
181	·000777	219	·000716	256	·000666	293	·000623
182	·000776	220	·000715	257	·000665	294	·000622
183	·000774	221	·000713	258	·000664	295	·000621
184	·000772	222	·000712	259	·000663	296	·000620
185	·000770	223	·000710	260	·000662	297	·000619
186	·000769	224	·000709	261	·000660	298	·000618
187	·000767	225	·000708	262	·000659	299	·000617
188	·000765	226	·000706	263	·000658	300	·000616
189	·000763						

TABLE FOR THE CALCULATION OF $\left(\frac{1}{1 + 00367\ T}\right)$.

T.		T.		T.		T.		T.	
1	·99634	31	·89785	61	·81708	91	·74964	121	·69249
2	·99271	32	·89490	62	·81464	92	·74758	122	·69073
3	·98911	33	·89197	63	·81221	93	·74554	123	·68899
4	·98553	34	·88906	64	·80979	94	·74351	124	·68725
5	·98198	35	·88617	65	·80740	95	·74148	125	·68552
6	·97845	36	·88330	66	·80501	96	·73947	126	·68380
7	·97495	37	·88044	67	·80264	97	·73747	127	·68209
8	·97148	38	·87761	68	·80028	98	·73548	128	·68038
9	·96803	39	·87479	69	·79794	99	·73350	129	·67869
10	·96460	40	·87199	70	·79561	100	·73153	130	·67700
11	·96120	41	·86921	71	·79329	101	·72957	131	·67532
12	·95782	42	·86645	72	·79099	102	·72762	132	·67365
13	·95446	43	·86370	73	·78870	103	·72568	133	·67199
14	·95113	44	·86097	74	·78642	104	·72376	134	·67034
15	·94782	45	·85826	75	·78416	105	·72184	135	·66870
16	·94454	46	·85556	76	·78191	106	·71993	136	·66706
17	·94127	47	·85289	77	·77967	107	·71803	137	·66543
18	·93803	48	·85022	78	·77745	108	·71615	138	·66380
19	·93482	49	·84758	79	·77523	109	·71427	139	·66219
20	·93162	50	·84495	80	·77304	110	·71240	140	·66059
21	·92844	51	·84234	81	·77085	111	·71055	141	·65899
22	·92529	52	·83974	82	·76867	112	·70870	142	·65740
23	·92216	53	·83716	83	·76651	113	·70686	143	·65582
24	·91905	54	·83460	84	·76436	114	·70503	144	·65424
25	·91596	55	·83205	85	·76222	115	·70321	145	·65268
26	·91289	56	·82952	86	·76010	116	·70140	146	·65112
27	·90984	57	·82700	87	·75798	117	·69960	147	·64957
28	·90682	58	·82450	88	·75588	118	·69781	148	·64802
29	·90381	59	·82201	89	·75379	119	·69603	149	·64648
30	·90082	60	·81954	90	·75171	120	·69425	150	·64495

TABLE SHOWING THE SPECIFIC GRAVITY OF SOME COMMON SUBSTANCES.

	Specific Gravity.		Specific Gravity.
Aluminium bronze	7·68	Oak	·77--·98
Brass	7·3–8·5	Oil, linseed	·94
Cork	·240	Oil, olive	·915
Fir	·512	Slate	2·5–2·8
Glass	3·2	Tallow..	·94
Gypsum	2·28	Tar	1·016
Guttapercha ..	·996	Tile	1·8
Gun-metal	8·5	Water (sea) ..	1·027
Ivory	1·82	Indiarubber ..	·925
Limestone	2·6	Porcelain	2·3

TABLE SHOWING THE DENSITY OF WATER AT ORDINARY TEMPERATURE.

Temp.	Density.	Temp.	Density.	Temp.	Density.
0°C.	·999871	11°C.	·999655	22°C.	·997826
1	·999928	12	·999549	23	·997601
2	·999969	13	·999430	24	·997367
3	·999991	14	·999299	25	·997120
4	1·000000	15	·999160	26	·996866
5	·999990	16	·999002	27	·996603
6	·999970	17	·998841	28	·996331
7	·999933	18	·998654	29	·996051
8	·999886	19	·998460	30	·995765
9	·999824	20	·998259	100	·958650
10	·999747	21	·998047		

TABLE SHOWING THE SPECIFIC GRAVITY OF IMPORTANT SALTS.

	Specific Gravity.		Specific Gravity.
Alum (potassium)	1·73	Nitrate of silver	4·36
„ (ammonium)	1·63	„ „ barium	3·2
Bichromate of potassium	2·60	„ „ potassium	2·12
Borax (cryst.)	1·69	„ „ sodium	2·26
Bromide of silver	6·35	„ „ strontium	2·8
„ of potassium	2·42	Oxalate of silver	5·61
Carbonate of barium	4·3	„ „ lead	6·38
„ „ lead	6·4	„ „ potassium (acid)	3·06
„ „ potassium	2·27	Phosphate of calcium	3·18
„ „ sodium (crys.)	1·45	„ „ sodium (crys.)	1·52
Chlorate of potassium	2·35	„ „ ammonium	1·5
Chloride of ammonium	1·5	Sulphate of barium	4·5
„ „ silver	5·5	„ „ calcium (gyp.)	2·33
„ „ barium (crys.)	3·05	„ „ copper (crys.)	2·3
„ „ calcium (fus.)	2·21	„ „ iron	1·97
„ „ calcium (crys.)	1·61	„ „ magnesium	1·75
„ „ mercurosum	7·0	„ „ potassium	2·66
„ „ mercuricum	5·42	„ „ sodium (crys.)	1·5
„ „ potassium	1·95	„ „ zinc (crys.)	2·04
„ „ sodium	2·16	Sulphide of antimony	4·62
Chromate of lead	6·1	„ „ silver	6·85
„ „ potassium	2·64	„ „ cupricum	4·16
Ferrocyanide of potassium	1·83	„ „ stannosum	4.97
Iodide of silver	5·61	„ „ stannicum	4·6
„ „ lead	6·38	„ „ ferrosum	4·4
„ „ potassium	3·06	„ „ mercury	8·13

Otto's Table of the Strength of Sulphuric Acid (Oil of Vitriol) of different Densities at the Temperature of 15° C.

Per cent. of H_2SO_4.	Specific Gravity.	Per cent. of SO_3.	Per cent. of H_2SO_4.	Specific Gravity.	Per cent. of SO_3.
100	1·8426	81·63	75	1·6750	61·22
99	1·8420	80·81	74	1·6630	60·40
98	1·8406	80·00	73	1·6510	59·59
97	1·8400	79·18	72	1·6390	58·77
96	1·8384	78·36	71	1·6270	57·95
95	1·8376	77·55	70	1·6150	57·14
94	1·8356	76·73	69	1·6040	56·32
93	1·8340	75·91	68	1·5920	55·59
92	1·8310	75·10	67	1·5800	54·69
91	1·8270	74·28	66	1·5860	53·87
90	1·8220	73·47	65	1·5570	53·05
89	1·8160	72·65	64	1·5450	52·24
88	1·8090	71·83	63	1·5340	51·42
87	1·8020	71·02	62	1·5230	50·61
86	1·7940	70·10	61	1·5120	49·79
85	1·7860	69·38	60	1·5010	48·98
84	1·7770	68·57	59	1·4900	48·16
83	1·7670	67·75	58	1·4800	47·34
82	1·7560	66·94	57	1·4690	46·53
81	1·7450	66·12	56	1·4586	45·71
80	1·7340	65·30	55	1·4480	44·89
79	1·7220	64·48	54	1·4380	44·07
78	1·7100	63·67	53	1·4280	43·26
77	1·6980	62·85	52	1·4180	42·45
76	1·6860	62·04	51	1·4080	41·63

OTTO'S TABLE OF STRENGTH OF SULPHURIC ACID OF DIFFERENT DENSITIES—*continued.*

Per cent. of H_2SO_4.	Specific Gravity.	Per cent. of SO_3.	Per cent. of H_2SO_4.	Specific Gravity.	Per cent. of SO_3.
50	1·3980	40·81	25	1·1820	20·40
49	1·3866	40·00	24	1·1740	19·58
48	1·3790	39·18	23	1·1670	18·77
47	1·3700	38·36	22	1·1590	17·95
46	1·3610	37·55	21	1·1516	17·14
45	1·3510	36·73	20	1·1440	16·32
44	1·3420	35·82	19	1·1360	15·51
43	1·3330	35·10	18	1·1290	14·69
42	1·3240	34·28	17	1·1210	13·87
41	1·3150	33·47	16	1·1136	13·06
40	1·3060	32·65	15	1·1060	12·24
39	1·2976	31·83	14	1·0980	11·42
38	1·2890	31·02	13	1·0910	10·61
37	1·2810	30·20	12	1·0830	9·790
36	1·2720	29·38	11	1·0756	8·980
35	1·2640	28·57	10	1·0680	8·160
34	1·2560	27·75	9	1·0610	7·340
33	1·2476	26·94	8	1·0536	6·530
32	1·2390	26·12	7	1·0464	5·710
31	1·2310	25·30	6	1·0390	4·890
30	1·2230	24·49	5	1·0320	4·080
29	1·2150	23·67	4	1·0256	3·260
28	1·2066	22·85	3	1·0190	2·445
27	1·1980	22·03	2	1·0130	1·630
26	1·1900	21·22	1	1·0064	0·816

ANTHON'S TABLE BY WHICH TO PREPARE SULPHURIC ACID (OIL OF VITRIOL) OF ANY STRENGTH BY MIXING THE ACID OF 1·86 SPECIFIC GRAVITY WITH WATER.

100 parts of Water at 15° to 20° being mixed with parts of Sulphuric Acid of 1·86 sp. gr.	Give an Acid of Specific Gravity.	100 parts of Water at 15° to 20° being mixed with parts of Sulphuric Acid of 1·86 sp. gr.	Give an Acid of Specific Gravity.	100 parts of Water at 15° to 20° being mixed with parts of Sulphuric Acid of 1·86 sp. gr.	Give an Acid of Specific Gravity.
1	1·009	130	1·456	370	1·723
2	1·015	140	1·473	380	1·727
5	1·035	150	1·490	390	1·730
10	1·060	160	1·510	400	1·733
15	1·090	170	1·530	410	1·737
20	1·113	180	1·543	420	1·740
25	1·140	190	1·556	430	1·743
30	1·165	200	1·568	440	1·746
35	1·187	210	1·580	450	1·750
40	1·210	220	1·593	460	1·754
45	1·229	230	1·606	470	1·757
50	1·248	240	1·620	480	1·760
55	1·265	250	1·630	490	1·763
60	1·280	260	1·640	500	1·766
65	1·297	270	1·648	510	1·768
70	1·312	280	1·654	520	1·770
75	1·326	290	1·667	530	1·772
80	1·340	300	1·678	540	1·774
85	1·357	310	1·689	550	1·776
90	1·372	320	1·700	560	1·777
95	1·386	330	1·705	580	1·778
100	1·398	340	1·710	590	1·780
110	1·420	350	1·714	600	1·782
120	1·438	360	1·719		

TABLE SHOWING THE STRENGTH OF NITRIC ACID (AQUA-FORTIS) (HNO_3) BY SPECIFIC GRAVITY.

Per cent.	Specific Gravity. At 0° C.	Specific Gravity. At 15° C.	Per cent.	Specific Gravity. At 0° C.	Specific Gravity. At 15° C.
100·00	1·559	1·530	67·00	1·430	1·410
99·84	1·559	1·530	66·00	1·425	1·405
99·72	1·558	1·530	65·07	1·420	1·400
99·52	1·557	1·529	64·00	1·415	1·395
97·89	1·551	1·523	63·59	1·413	1·393
97·100	1·548	1·520	62·00	1·404	1·386
96·00	1·544	1·516	61·21	1·400	1·381
95·27	1·542	1·514	60·00	1·393	1·374
94·00	1·537	1·509	59·59	1·391	1·372
93·01	1·533	1·506	58·88	1·387	1·368
92·00	1·529	1·503	58·00	1·382	1·363
91·00	1·526	1·499	57·00	1·376	1·358
90·00	1·522	1·495	56·10	1·371	1·353
89·56	1·521	1·494	55·00	1·365	1·346
88·00	1·514	1·488	54·00	1·359	1·341
87·45	1·513	1·486	53·81	1·358	1·339
86·17	1·507	1·482	53·00	1·353	1·335
85·00	1·503	1·478	52·33	1·349	1·331
84·00	1·499	1·474	50·99	1·341	1·323
83·00	1·495	1·470	49·97	1·334	1·317
82·00	1·492	1·467	49·00	1·328	1·312
80·96	1·488	1·463	48·00	1·321	1·304
80·00	1·484	1·460	47·18	1·315	1·298
79·00	1·481	1·456	46·64	1·312	1·295
77·66	1·476	1·451	45·00	1·300	1·284
76·00	1·469	1·445	43·53	1·291	1·274
75·00	1·465	1·442	42·00	1·280	1·264
74·01	1·462	1·438	41·00	1·274	1·257
73·00	1·457	1·435	40·00	1·267	1·251
72·39	1·455	1·432	39·00	1·260	1·244
71·24	1·450	1·429	37·95	1·253	1·237
69·96	1·444	1·423	36·00	1·248	1·225
69·20	1·441	1·419	35·00	1·234	1·218
68·00	1·435	1·414	33·86	1·226	1·211

TABLE SHOWING THE STRENGTH OF NITRIC ACID (HNO_3) BY SPECIFIC GRAVITY—*continued.*

Per cent.	Specific Gravity. At 0° C.	Specific Gravity. At 15° C.	Per cent.	Specific Gravity. At 0° C.	Specific Gravity. At 15° C.
32·00	1·214	1·198	17·47	1·115	1·105
31·00	1·207	1·192	15·00	1·099	1·089
30·00	1·200	1·185	13·00	1·085	1·077
29·00	1·194	1·179	11·41	1·075	1·067
28·00	1·187	1·172	7·22	1·050	1·045
27·00	1·180	1·166	4·00	1·026	1·022
25·71	1·171	1·157	2·00	1·013	1·010
23·00	1·153	1·138	0·00	1·000	1·000
20·00	1·132	1·120			

TABLE SHOWING THE STRENGTH OF SOLUTIONS OF OXALIC ACID BY SPECIFIC GRAVITY AT 17·5° C.

Per cent. $C_2H_2O_4$, $2H_2O$.	Specific Gravity.	Per cent. $C_2H_2O_4$, $2H_2O$.	Specific Gravity.
1	1·0032	7	1·0204
2	1·0064	8	1·0226
3	1·0096	9	1·0248
4	1·0128	10	1·0271
5	1·0160	11	1·0289
6	1·0182	12	1·0309

TABLE SHOWING THE STRENGTH OF SOLUTIONS OF NITRIC ACID (AQUA-FORTIS) BY SPECIFIC GRAVITY.

Specific Gravity.	Liquid Acid (sp.gr.1·5) in 100 parts.	Dry Acid in 100 parts.	Specific Gravity.	Liquid Acid (sp.gr.1·5) in 100 parts.	Dry Acid in 100 parts.
1·5000	100	79·700	1·4189	75	59·775
1·4980	99	78·903	1·4147	74	58·978
1·4960	98	78·106	1·4107	73	58·181
1·4940	97	77·309	1·4065	72	57·384
1·4910	96	76·512	1·4023	71	56·557
1·4880	95	75·715	1·3978	70	55·790
1·4850	94	74·918	1·3945	69	54·993
1·4820	93	74·121	1·3882	68	54·196
1·4790	92	73·324	1·3833	67	53·339
1·4760	91	72·527	1·3783	66	52·602
1·4730	90	71·730	1·3732	65	51·805
1·4700	89	70·933	1·3681	64	51·068
1·4670	88	70·136	1·3630	63	50·211
1·4640	87	69·339	1·3579	62	49·414
1·4600	86	68·542	1·3529	61	48·617
1·4570	85	67·745	1·3477	60	47·820
1·4530	84	66·948	1·3427	59	47·023
1·4500	83	66·155	1·3376	58	46·226
1·4460	82	65·354	1·3323	57	45·429
1·4424	81	64·557	1·3270	56	44·632
1·4385	80	63·760	1·3216	55	43·836
1·4346	79	62·963	1·3163	54	43·038
1·4306	78	62·166	1·3110	53	42·241
1·4269	77	61·369	1·3056	52	41·444
1·4228	76	60·572	1·3001	51	40·647

TABLE SHOWING THE STRENGTH OF SOLUTIONS OF NITRIC ACID—*continued.*

Specific Gravity.	Liquid Acid (sp.gr.1·5) in 100 parts.	Dry Acid in 100 parts.	Specific Gravity.	Liquid Acid (sp.gr.1·5) in 100 parts.	Dry Acid in 100 parts.
1·2947	50	39·850	1·1403	25	19·925
1·2887	49	39·053	1·1345	24	19·128
1·2826	48	38·256	1·1286	23	18·331
1·2765	47	37·459	1·1227	22	17·534
1·2705	46	36·662	1·1168	21	16·737
1·2644	45	35·865	1·1109	20	15·940
1·2583	44	35·068	1·1051	19	15·143
1·2523	43	34·271	1·0993	18	14·346
1·2462	42	33·474	1·0935	17	13·549
1·2402	41	32·677	1·0878	16	12·752
1·2341	40	31·880	1·0821	15	11·955
1·2277	39	31·083	1·0764	14	11·158
1·2212	38	30·286	1·0708	13	10·368
1·2148	37	29·489	1·0651	12	9·564
1·2084	36	28·692	1·0595	11	8·767
1·2019	35	27·895	1·0540	10	7·970
1·1958	34	27·098	1·0485	9	7·173
1·1895	33	26·301	1·0430	8	6·376
1·1833	32	25·504	1·0375	7	5·579
1·1770	31	24·707	1·0320	6	4·782
1·1709	30	23·900	1·0267	5	3·985
1·1648	29	23·113	1·0212	4	3·138
1·1587	28	22·316	1·0159	3	2·391
1·1515	27	21·517	1·0106	2	1·594
1·1467	26	20·722	1·0053	1	0·797

TABLE SHOWING THE STRENGTH OF HYDROCHLORIC ACID (SPIRIT OF SALT) BY SPECIFIC GRAVITY.

Specific Gravity	Per cent. of HCl.	Per cent. of Acid of 1·20 sp. gr.	Specific Gravity.	Per cent. of HCl.	Per cent. of Acid of 1·20 sp. gr.
1·2000	40·777	100	1·1515	30·582	75
1·1982	40·369	99	1·1494	30·174	74
1·1964	39·961	98	1·1473	29·767	73
1·1946	39·554	97	1·1452	29·359	72
1·1928	39·146	96	1·1431	28·951	71
1·1910	38·738	95	1·1410	28·544	70
1·1893	38·330	94	1·1389	28·136	69
1·1875	37·923	93	1·1369	27·728	68
1·1857	37·516	92	1·1349	27·321	67
1·1846	37·108	91	1·1328	26·913	66
1·1822	36·700	90	1·1308	26·505	65
1·1802	36·292	89	1·1287	26·098	64
1·1782	35·884	88	1·1267	25·690	63
1·1762	35·476	87	1·1247	25·282	62
1·1741	35·068	86	1·1226	24·847	61
1·1721	34·660	85	1·1206	24·466	60
1·1701	34·252	84	1·1185	24·058	59
1·1681	33·845	83	1·1164	23·650	58
1·1661	33·437	82	1·1143	23·242	57
1·1641	33·029	81	1·1123	22·834	56
1·1620	32·621	80	1·1102	22·426	55
1·1599	32·213	79	1·1082	22·019	54
1·1578	31·805	78	1·1061	21·611	53
1·1557	31·398	77	1·1041	21·203	52
1·1536	30·990	76	1·1020	20·796	51

TABLE SHOWING THE STRENGTH OF HYDROCHLORIC ACID (SPIRIT OF SALT)—*continued.*

Specific Gravity.	Per cent. of HCl.	Per cent. of Acid of 1·20 sp. gr.	Specific Gravity.	Per cent. of HCl.	Per cent. of Acid of 1·20 sp. gr.
1·1000	20·388	50	1·0497	10·194	25
1·0980	19·980	49	1·0477	9·786	24
1·0960	19·572	48	1·0457	9·379	23
1·0939	19·165	47	1·0437	8·971	22
1·0919	18·757	46	1·0417	8·563	21
1·0899	18·349	45	1·0397	8·155	20
1·0879	17·941	44	1·0377	7·747	19
1·0859	17·534	43	1·0357	7·340	18
1·0838	17·126	42	1·0337	6·932	17
1·0818	16·718	41	1·0318	6·524	16
1·0798	16·310	40	1·0298	6·116	15
1·0778	15·902	39	1·0279	5·709	14
1·0758	15·494	38	1·0259	5·301	13
1·0738	15·087	37	1·0239	4·893	12
1·0718	14·679	36	1·0220	4·486	11
1·0697	14·271	35	1·0200	4·078	10
1·0677	13·863	34	1·0180	3·670	9
1·0657	13·456	33	1·0160	3·262	8
1·0637	13·049	32	1·0140	2·854	7
1·0617	12·641	31	1·0120	2·447	6
1·0597	12·233	30	1·0100	2·039	5
1·0577	11·825	29	1·0080	1·631	4
1·0557	11·418	28	1·0060	1·224	3
1·0537	11·010	27	1·0040	·816	2
1·0517	10·602	26	1·0020	·408	1

OUDEMANN'S TABLE, SHOWING THE STRENGTH OF SOLUTIONS OF ACETIC ACID (VINEGAR) BY SPECIFIC GRAVITY.

Acetic Acid, $C_2H_4O_2$, per cent.	Density.		Acetic Acid, $C_2H_4O_2$, per cent.	Density.	
	15° C.	40° C.		15° C.	40° C.
1	1·0007	0·9936	26	1·0363	1·0217
2	1·0022	0·9948	27	1·0375	1·0227
3	1·0037	0·9960	28	1·0388	1·0236
4	1·0052	0·9972	29	1·0400	1·0246
5	1·0067	0·9984	30	1·0412	1·0255
6	1·0083	0·9996	31	1·0424	1·0264
7	1·0098	1·0008	32	1·0436	1·0274
8	1·0113	1·0020	33	1·0447	1·0283
9	1·0127	1·0032	34	1·0459	1·0291
10	1·0142	1·0044	35	1·0470	1·0300
11	1·0157	1·0056	36	1·0481	1·0308
12	1·0171	1·0067	37	1·0492	1·0316
13	1·0185	1·0079	38	1·0502	1·0324
14	1·0200	1·0090	39	1·0513	1·0332
15	1·0214	1·0101	40	1·0523	1·0340
16	1·0228	1·0112	41	1·0533	1·0348
17	1·0242	1·0123	42	1·0543	1·0355
18	1·0256	1·0134	43	1·0552	1·0363
19	1·0270	1·0144	44	1·0562	1·0370
20	1·0284	1·0155	45	1·0571	1·0377
21	1·0298	1·0166	46	1·0580	1·0384
22	1·0311	1·0176	47	1·0589	1·0391
23	1·0324	1·0187	48	1·0598	1·0397
24	1·0337	1·0197	49	1·0607	1·0404
25	1·0350	1·0207	50	1·0615	1·0410

OUDEMANN'S TABLE, SHOWING THE STRENGTH OF SOLUTIONS OF ACETIC ACID—*continued.*

Acetic Acid, $C_2H_4O_2$, per cent.	Density.		Acetic Acid, $C_2H_4O_2$, per cent.	Density.	
	15° C.	40° C.		15° C.	40° C.
51	1·0623	1·0416	76	1·0747	1·0501
52	1·0631	1 0423	77	1·0748	1·0501
53	1·0638	1·0429	78	1·0748	1·0500
54	1·0646	1·0434	79	1·0748	1·0499
55	1·0653	1·0440	80	1·0748	1·0497
56	1·0660	1·0445	81	1·0747	1·0495
57	1·0666	1·0450	82	1·0746	1·0492
58	1·0673	1·0455	83	1·0744	1·0489
59	1·0679	1·0460	84	1·0742	1·0485
60	1·0685	1·0464	85	1·0739	1·0481
61	1·0691	1·0468	86	1·0736	1·0475
62	1·0697	1·0472	87	1·0731	1·0469
63	1·0702	1·0475	88	1·0726	1·0462
64	1·0707	1·0479	89	1·0720	1·0455
65	1·0712	1·0482	90	1·0713	1·0447
66	1·0717	1·0485	91	1·0705	1·0438
67	1·0721	1·0488	92	1·0696	1·0428
68	1·0725	1·0491	93	1 0686	1·0416
69	1·0729	1·0493	94	1·0674	1·0403
70	1·0733	1·0495	95	1·0660	1·0388
71	1·0737	1·0497	96	1·0644	1·0370
72	1·0740	1·0498	97	1·0625	1 0350
73	1·0742	1·0499	98	1·0604	1·0327
74	1·0744	1·0500	99	1·0580	1·0301
75	1·0746	1·0501	100	1·0553	1·0273

MOHR'S TABLE, SHOWING THE STRENGTH OF SOLUTIONS OF ACETIC ACID (VINEGAR) BY SPECIFIC GRAVITY.

Specific Gravity.	Per cent. of $C_2H_4O_2$.	Specific Gravity.	Per cent. of $C_2H_4O_2$.	Specific Gravity.	Per cent. of $C_2H_4O_2$.
1·000	0	1·045	34	1·0700	68
1·001	1	1·046	35	1·0700	69
1·002	2	1·047	36	1·0700	70
1·004	3	1·048	37	1·0710	71
1·0055	4	1·049	38	1·0710	72
1·0067	5	1·050	39	1·0720	73
1·008	6	1·0513	40	1·0720	74
1·010	7	1·0515	41	1·0720	75
1·012	8	1·052	42	1·0730	76
1·013	9	1·053	43	1·0732	77
1·015	10	1·054	44	1·0732	78
1·016	11	1·055	45	1·0735	79
1·017	12	1·055	46	1·0735	80
1·018	13	1·056	47	1·0732	81
1·020	14	1·058	48	1·0730	82
1·022	15	1·059	49	1·0730	83
1·023	16	1·060	50	1·0730	84
1·024	17	1·061	51	1·0730	85
1·025	18	1·062	52	1·0730	86
1·026	19	1·063	53	1·0730	87
1·027	20	1·063	54	1·0730	88
1·029	21	1·064	55	1·0730	89
1·031	22	1·064	56	1·0730	90
1·032	23	1·065	57	1·0721	91
1·033	24	1·066	58	1·0716	92
1·034	25	1·066	59	1·0708	93
1·035	26	1·067	60	1·0706	94
1·036	27	1·067	61	1·0700	95
1·038	28	1·067	62	1·0690	96
1·039	29	1·068	63	1·0680	97
1·040	30	1·068	64	1·0670	98
1·041	31	1·068	65	1·0655	99
1·0424	32	1·069	66	1·0635	100
1·044	33	1·069	67		

TABLE SHOWING THE STRENGTH OF SOLUTIONS OF PHOSPHORIC ACID BY SPECIFIC GRAVITY AT 15° C.

Specific Gravity.	Per cent. of H_3PO_4.	Per cent. of P_2O_5.	Specific Gravity.	Per cent. of H_3PO_4.	Per cent. of P_2O_5.
1·0054	1	·726	1·1962	31	22·506
1·0109	2	1·452	1 2036	32	23·232
1·0164	3	2·178	1·2111	33	23·958
1·0220	4	2·904	1·2186	34	24·684
1·0276	5	3·630	1·2262	35	25·410
1·0333	6	4·356	1·2338	36	26·136
1·0390	7	5·082	1·2415	37	26·862
1·0449	8	5·808	1·2493	38	27·588
1·0508	9	6·534	1·2572	39	28·314
1·0567	10	7·260	1·2651	40	29·040
1·0627	11	7·986	1·2731	41	29·766
1·0688	12	8·712	1·2812	42	30·492
1·0749	13	9·438	1·2894	43	31·218
1·0811	14	10·164	1·2976	44	31·944
1·0874	15	10·890	1·3059	45	32·670
1·0937	16	11·616	1·3143	46	33·496
1·1001	17	12·342	1·3227	47	34·222
1·1065	18	13·068	1·3313	48	34·948
1·1130	19	13·794	1·3399	49	35·674
1·1196	20	14·520	1·3486	50	36·400
1·1262	21	15·246	1·3573	51	37·126
1·1329	22	15·972	1·3661	52	37·852
1·1397	23	16·698	1·3750	53	38·578
1·1465	24	17·424	1·3840	54	39·304
1·1534	25	18·150	1·3931	55	40·030
1·1604	26	18·876	1·4022	56	40·756
1·1674	27	19·602	1·4114	57	41·482
1·1745	28	20·328	1·4207	58	42·208
1·1817	29	21·054	1·4301	59	42·934
1·1889	30	21·780	1·4395	60	43·660

TABLE SHOWING THE STRENGTH OF SOLUTIONS OF TARTARIC ACID BY SPECIFIC GRAVITY AT 15° C.

Specific Gravity.	Per cent. of $C_4H_6O_6$.	Specific Gravity.	Per cent. of $C_4H_6O_6$.	Specific Gravity.	Per cent. of $C_4H_6O_6$.
1·0045	1	1·1020	21	1·2078	40
1·0090	2	1·1072	22	1·2138	41
1·0136	3	1·1124	23	1·2198	42
1·0179	4	1·1175	24	1·2259	43
1·0224	5	1·1227	25	1·2317	44
1·0273	6	1·1282	26	1·2377	45
1·0322	7	1·1338	27	1·2441	46
1·0371	8	1·1393	28	1·2504	47
1·0420	9	1·1449	29	1·2568	48
1·0469	10	1·1505	30	1·2632	49
1·0517	11	1·1560	31	1·2696	50
1·0565	12	1·1615	32	1·2762	51
1·0613	13	1·1670	33	1·2828	52
1·0661	14	1·1726	34	1·2894	53
1·0709	15	1·1781	35	1·2961	54
1·0761	16	1·1840	36	1·3027	55
1·0813	17	1·1900	37	1·3093	56
1·0865	18	1·1959	38	1·3159	57
1·0917	19	1·2019	39	1·3220	57·9
1·0969	20				

Many tables are compared to water at 15° C.; to reduce them so as to compare with water at 4° C. (maximum density), multiply the given densities by ·99916. For most purposes, however, the difference may be disregarded.

TABLE SHOWING THE STRENGTH OF SOLUTIONS OF TANNIC ACID BY SPECIFIC GRAVITY AT 15° C.

Specific Gravity.	Per cent. of Tannic Acid.	Specific Gravity.	Per cent. of Tannic Acid.
1·0004	·1	1·0104	2·6
1·0008	·2	1·0108	2·7
1·0012	·3	1·0112	2·8
1·0016	·4	1·0116	2·9
1·0020	·5	1·0120	3·0
1·0024	·6	1·0124	3·1
1·0028	·7	1 0128	3·2
1·0032	·8	1·0132	3·3
1·0036	·9	1·0136	3·4
1·0040	1·0	1·0140	3·5
1·0044	1·1	1·0144	3·6
1·0048	1·2	1·0148	3·7
1·0052	1·3	1·0152	3·8
1·0056	1·4	1·0156	3·9
1·0060	1·5	1·0160	4·0
1·0064	1·6	1·0164	4·1
1·0068	1·7	1·0168	4·2
1·0072	1·8	1·0172	4·3
1·0076	1·9	1·0176	4·4
1·0080	2·0	1 0180	4·5
1·0084	2·1	1·0184	4·6
1·0088	2·2	1·0188	4·7
1·0092	2·3	1·0192	4·8
1·0096	2·4	1·0196	4·9
1·0100	2·5	1·0200	5·0

Table showing the Quantity of Potassium Oxide, Potassium Hydrate (Caustic Potash), in Solutions at 15° C.

The first part of the Table is Tünnerman's; the second is taken from that constructed by Richter.

Per cent. of K_2O.	Per cent. of KHO.	Specific Gravity.	Per cent. of K_2O.	Per cent. of KHO.	Specific Gravity.
·5658	0·738	1·0050	23·764	28 303	1·2648
1·697	2·021	1·0153	24·895	29·650	1·2805
2·829	3·369	1·0260	26·027	30·998	1·2966
3·961	4·717	1·0369	27·158	32·345	1·3131
5·002	5·957	1·0478	28·290	33·693	1·3300
6·224	7·412	1·0589	29·34	34·94	1·30
7·355	8·760	1·0703	30·74	36·91	1·32
8·487	10·108	1·0819	32·14	38·28	1·34
9·619	11·456	1·0938	33·46	39·85	1·36
10 750	12·803	1·1059	34·74	41·37	1·38
11·882	14·151	1·1182	35·99	42·86	1·40
13·013	15·498	1·1308	37·97	45·22	1·42
14·145	16·846	1·1437	40·17	47·84	1·44
15·277	18·195	1·1568	42·31	50·39	1·46
16·408	19·542	1·1702	44·40	52·88	1·48
17·540	20·890	1·1839	46·45	55·32	1·50
18·671	22·237	1·1979	48·46	57·71	1·52
19·803	23·585	1·2122	50·09	59·65	1·54
20·935	24·933	1·2268	51·58	61·43	1·56
21·500	25·606	1·2342	53·06	63·19	1·58
22·632	26·954	1·2493			

TABLE SHOWING THE STRENGTH OF SOLUTIONS OF SODIUM AND OF POTASSIUM HYDRATE BY SPECIFIC GRAVITY AT 15° C.

Per cent.	Specific Gravity, KHO.	Specific Gravity, NaHO.	Per cent.	Specific Gravity, KHO.	Specific Gravity, NaHO.
5	1·036	1·059	40	1·411	1·437
10	1·077	1·115	45	1·475	1·488
15	1·124	1·170	50	1·539	1·540
20	1·175	1 225	55	1·604	1·591
25	1·230	1·279	60	1·667	1·643
30	1·288	1·332	65	1·729	1·695
35	1·349	1·384	70	1·790	1·748

TABLE SHOWING THE QUANTITY OF FUSED POTASSA IN CAUSTIC LYE OF DIFFERENT DENSITIES.

Specific Gravity.	K_2O per cent.	Specific Gravity.	K_2O per cent.	Specific Gravity.	K_2O per cent.
1·58	53·06	1·42	37·97	1·26	26·34
1·56	51·58	1·40	35·99	1·24	24·77
1·54	50·09	1·38	34·74	1·10	11·28
1·52	48·46	1·36	33·46	1·08	9·20
1·50	46·45	1·34	32·14	1·06	7·02
1·48	44·40	1·32	30·74	1·04	4·77
1·46	42·31	1·30	29·34	1·02	2·44
1·44	40·17	1·28	27·86	1·00	0·00

TABLE CONSTRUCTED BY DALTON, CONFIRMED BY MEHRENS, SHOWING THE STRENGTH OF SOLUTIONS OF POTASH.

Specific Gravity.	KHO per cent.	K_2O per cent.	Specific Gravity.	KHO per cent.	K_2O per cent.
2·4	—	100·0	1·42	40·97	34·4
2·2	100·5	84·0	1·39	38·59	32·4
2·0	86·22	72·4	1·36	35·01	29·4
1·88	75·74	63·6	1·33	31·32	26·3
1·78	67·65	56·8	1·28	27·87	23·4
1·68	60·98	51·2	1·23	23·22	19·5
1·60	55·62	46·7	1·19	19·29	16·2
1·52	51·09	42·9	1·15	15·48	13·0
1·47	47·16	39·6	1·11	11·31	9·5
1·44	43·83	36·8	1·06	5·59	4·7

RICHTER'S TABLE, SHOWING THE QUANTITY OF SODIUM OXIDE CONTAINED IN LYES OF DIFFERENT DENSITIES.

Specific Gravity.	Na_2O per cent.	Specific Gravity.	Na_2O per cent.	Specific Gravity.	Na_2O per cent.
1·00	0·00	1·14	12·81	1·28	26·33
1·02	2·07	1·16	14·73	1·30	28·16
1·04	4·02	1·18	16·73	1·32	29·96
1·06	5·89	1·20	18·71	1·34	31·67
1·08	7·69	1·22	20·66	1·35	32·40
1·10	9·43	1·24	22·58	1·36	33·08
1·12	11·10	1·26	24·47	1·38	34·41

TÜNNERMAN'S TABLE, SHOWING THE QUANTITY OF SODIUM OXIDE IN SOLUTIONS AT 15° C.

Per cent. of Na_2O.	Specific Gravity.	Per cent. of Na_2O.	Specific Gravity.
·302	1·0040	15·714	1·2453
·601	1·0081	16·319	1·2515
1·209	1·0163	16·923	1 2578
1·813	1·0246	17·528	1·2642
2·418	1·0330	18·132	1·2708
3·022	1·0414	18·730	1·2775
3·626	1·0500	19·341	1·2843
4·231	1·0587	19·954	1·2912
4·835	1·0675	20·550	1·2982
5·440	1·0764	21·154	1·3053
6·044	1·0855	21·758	1·3125
6·648	1·0948	21·894	1·3143
7·253	1·1042	22·363	1·3198
7·857	1·1137	22·967	1·3273
8·462	1·1233	23·572	1·3349
9·066	1·1330	24·176	1·3426
9·670	1·1428	24·780	1·3505
10·275	1·1528	25·385	1·3586
10·879	1·1630	25·989	1·3668
11·484	1·1734	26·594	1·3751
12·088	1·1841	27·200	1·3836
12·692	1·1948	27·802	1·3923
13·297	1·2058	28·407	1·4011
13·901	1·2178	29·011	1·4101
14·506	1·2280	29·616	1·4193
15·110	1·2392	30·220	1·4285

Davy's Table, showing the Strength of Solutions of Ammonia.

Specific Gravity.	Per cent. of Ammonia.	Specific Gravity.	Per cent. of Ammonia.	Specific Gravity.	Per cent. of Ammonia.
·8750	32·30	·9326	17·52	·9545	11·56
·8875	29·25	·9385	15·88	·9573	10·82
·9000	26·00	·9435	14·53	·9597	10·17
·9054	25·37	·9476	13·46	·9619	9·60
·9166	22·07	·9513	12·40	·9692	9·50
·9255	19·54				

Table showing the Strength of Solutions of Ammonia by Specific Gravity at 14° (? C.).

Specific Gravity.	Per cent. of NH_3.	Specific Gravity.	Per cent. of NH_3.	Specific Gravity.	Per cent. of NH_3.
·9959	1	·9484	13	·9106	25
·9915	2	·9449	14	·9078	26
·9873	3	·9414	15	·9052	27
·9831	4	·9380	16	·9026	28
·9790	5	·9347	17	·9001	29
·9749	6	·9314	18	·8976	30
·9709	7	·9283	19	·8953	31
·9670	8	·9251	20	·8929	32
·9631	9	·9221	21	·8907	33
·9593	10	·9191	22	·8885	34
·9556	11	·9162	23	·8864	35
·9520	12	·9133	24	·8844	36

DALTON'S TABLE, SHOWING THE STRENGTH OF SOLUTIONS OF AMMONIA.

Specific Gravity.	Grains of Ammonia in a Hundred of the Liquid.	Boiling Point. F. °	Volumes of Gas in One Volume of the Solution.
·850	35·3	26	494
·860	32·6	38	456
·870	29·9	50	419
·880	27·3	62	382
·890	24·7	74	346
·900	22·2	86	311
·910	19·8	98	277
·920	17·4	110	244
·930	15·1	122	211
·940	12·8	134	180
·950	10·5	146	147
·960	8·3	158	116
·970	6·2	173	87
·980	4·1	187	57
·990	2·0	196	28

URE'S TABLE, SHOWING THE STRENGTH OF SOLUTIONS OF AMMONIA.

Specific Gravity.	Per cent. of Ammonia.	Specific Gravity.	Per cent. of Ammonia.	Specific Gravity.	Per cent. of Ammonia.
·8914	27·940	·9177	21·200	·9564	10·600
·8937	27·633	·9227	19·875	·9614	9·275
·8967	27·038	·9275	18·550	·9662	7·950
·8983	26·751	·9320	17·225	·9716	6·625
·9000	26·500	·9363	15·900	·9768	5·300
·9045	25·175	·9410	14·575	·9828	3·975
·9090	23·850	·9455	13·250	·9887	2·650
·9133	22·525	·9510	11·925	·9945	1·325

TABLE SHOWING THE STRENGTH OF SOLUTIONS OF POTASSIUM CARBONATE BY SPECIFIC GRAVITY AT 15° C.

Specific Gravity.	Per cent. of K_2CO_3.	Specific Gravity.	Per cent. of K_2CO_3.
1·00914	1	1·27893	28
1·01829	2	1·28999	29
1·02743	3	1·30105	30
1·03658	4	1·31261	31
1·04572	5	1·32417	32
1·05513	6	1·33573	33
1·06454	7	1·34729	34
1·07396	8	1·35885	35
1·08337	9	1·37082	36
1·09278	10	1·38279	37
1·10258	11	1·39476	38
1·11238	12	1·40673	39
1·12219	13	1·41870	40
1·13199	14	1·43104	41
1·14179	15	1·44338	42
1·15200	16	1·45573	43
1·16222	17	1·46807	44
1·17243	18	1·48041	45
1·18265	19	1·49314	46
1·19286	20	1·50588	47
1·20344	21	1·51861	48
1·21402	22	1·53135	49
1·22459	23	1·54408	50
1·23517	24	1·55728	51
1·24575	25	1·57048	52
1·25681	26	1·57079	52·024
1·26787	27		

TABLE SHOWING THE STRENGTH OF SOLUTIONS OF SODIUM CARBONATE ("SODA") BY SPECIFIC GRAVITY AT 23° C.

Specific Gravity.	Per cent. of Na_2CO_3 + 10 Aq.	Per cent. of Na_2CO_3.	Specific Gravity.	Per cent. of Na_2CO_3 + 10 Aq.	Per cent. of Na_2CO_3.
1·0038	1	·370	1·1035	26	9·635
1·0076	2	·741	1·1076	27	10·005
1·0114	3	1·112	1·1117	28	10·376
1·0153	4	1·482	1·1158	29	10·746
1·0192	5	1·853	1·1200	30	11·118
1·0231	6	2·223	1·1242	31	11·488
1·0270	7	2·594	1·1284	32	11·859
1·0309	8	2·965	1·1326	33	12·230
1·0348	9	3·335	1·1368	34	12·600
1·0388	10	3·706	1·1410	35	12·971
1·0428	11	4·076	1·1452	36	13·341
1·0468	12	4·447	1·1494	37	13·712
1·0508	13	4·817	1·1536	38	14·082
1·0548	14	5·188	1·1578	39	14·453
1·0588	15	5·558	1·1620	40	14·824
1·0628	16	5·929	1·1662	41	15·195
1·0668	17	6·299	1·1704	42	15·566
1·0708	18	6·670	1·1746	43	15·936
1·0748	19	7·041	1·1788	44	16·307
1·0789	20	7·412	1·1830	45	16·677
1·0830	21	7·782	1·1873	46	17·048
1·0871	22	8·153	1·1916	47	17·418
1·0912	23	8·523	1·1959	48	17·789
1·0953	24	8·894	1·2002	49	18·159
1·0994	25	9·264	1·2045	50	18·530

TABLE SHOWING THE STRENGTH OF SOLUTIONS OF SODIUM SULPHATE AT 19° C.

Specific Gravity.	Per cent. of Na_2SO_4+10Aq.	Per cent. of Na_2SO_4.	Specific Gravity.	Per cent. of Na_2SO_4+10Aq.	Per cent. of Na_2SO_4.
1·0040	1	·441	1·0642	16	7·056
1·0079	2	·882	1·0683	17	7·497
1·0118	3	1·323	1·0725	18	7·938
1·0158	4	1·764	1·0766	19	8·379
1·0198	5	2·205	1·0867	20	8·820
1·0238	6	2·646	1·0849	21	9·261
1·0278	7	3·087	1·0890	22	9·702
1·0318	8	3·528	1·0931	23	10·143
1·0358	9	3·969	1·0973	24	10·584
1·0398	10	4·410	1·1015	25	11·025
1·0439	11	4·851	1·1057	26	11·466
1·0479	12	5·292	1·1100	27	11·907
1·0520	13	5·773	1·1142	28	12·348
1·0560	14	6·174	1·1184	29	12·789
1·0601	15	6·615	1·1226	30	13·230

TABLE SHOWING THE STRENGTH OF SOLUTIONS OF SULPHATE OF AMMONIUM BY SPECIFIC GRAVITY AT 19° C.

Specific Gravity.	Per-centage.	Specific Gravity.	Per-centage.	Specific Gravity.	Per-centage.
1·0057	1	1·1035	18	1 2004	35
1·0115	2	1·1092	19	1·2060	36
1·0172	3	1·1149	20	1·2116	37
1·0230	4	1·1207	21	1·2172	38
1·0287	5	1·1265	22	1·2228	39
1·0345	6	1·1323	23	1·2284	40
1·0403	7	1·1381	24	1·2343	41
1·0460	8	1·1439	25	1·2402	42
1·0518	9	1·1496	26	1·2462	43
1·0575	10	1·1554	27	1·2522	44
1·0632	11	1·1612	28	1·2583	45
1·0690	12	1·1670	29	1·2644	46
1·0747	13	1·1724	30	1·2705	47
1·0805	14	1·1780	31	1·2766	48
1·0862	15	1·1836	32	1·2828	49
1·0920	16	1·1892	33	1·2890	50
1·0977	17	1·1948	34		

To find the strength of a solution of glycerine by specific gravity. Let D = observed density.

$$\frac{1266 - 1000\,D}{2{\cdot}66} = \text{Percentage of water by measure.}$$

$$\frac{1266 - 1000\,D}{2{\cdot}66 \times D} = \text{Percentage of water by weight.}$$

TABLE SHOWING THE STRENGTH OF SOLUTIONS OF MAGNESIUM SULPHATE (EPSOM SALTS) BY SPECIFIC GRAVITY AT 15° C.

Specific Gravity.	Per cent. of $MgSO_4+7Aq.$	Specific Gravity.	Per cent. of $MgSO_4+7Aq.$
1·006	·99	1·120	23·07
1·010	1·96	1·124	23·66
1·016	2·91	1·128	24·24
1·020	3·84	1·131	24·81
1·024	4·76	1·134	25·37
1·029	5·66	1·137	25·92
1·034	6·54	1·140	26·47
1·039	7·41	1·143	27·01
1·043	8·25	1·145	27·53
1·046	9·09	1·147	28·05
1·050	9·91	1·150	28·57
1·055	10·71	1·153	29·07
1·059	11·50	1·155	29·57
1·064	12·28	1·158	30·06
1·068	13·04	1·161	30·55
1·072	13·79	1·164	31·03
1·075	14·52	1·166	31·51
1·080	15·25	1·168	31·97
1·084	15·96	1·170	32·43
1·088	16·66	1·172	32·88
1·091	17·35	1·174	33·33
1·095	18·03	1·207	37·50
1·098	18·69	1·230	41·17
1·101	19·35	1·250	44·44
1·104	20·00	1·270	47·36
1·107	20·63	1·282	50·00
1·111	21·26	1·294	52·38
1·114	21·87	1·304	54·54
1·117	22·48		

TABLE SHOWING THE STRENGTH OF SOLUTIONS OF ZINC SULPHATE (WHITE VITRIOL) AT 20·5° C.

Specific Gravity.	Per cent. of $ZnSO_4 + 7OH_2$.	Per cent. of $ZnSO_4$.	Specific Gravity.	Per cent. of $ZnSO_4 + 7OH_2$.	Per cent. of $ZnSO_4$.
1·0057	1	·56	1·1842	29	16·24
1·0115	2	1·12	1·1914	30	16·80
1·0173	3	1·68	1·1987	31	17·36
1·0231	4	2·24	1·2060	32	17·92
1·0289	5	2·80	1·2134	33	18·48
1·0348	6	3·36	1·2209	34	19·04
1·0407	7	3·92	1·2285	35	19·60
1·0467	8	4·48	1·2362	36	20·16
1·0527	9	5·04	1·2439	37	20·72
1·0588	10	5·60	1·2517	38	21·28
1·0649	11	6·16	1·2595	39	21·84
1·0710	12	6·72	1·2674	40	22·40
1·0772	13	7·28	1·2754	41	22·96
1·0835	14	7·84	1·2834	42	23·52
1·0899	15	8·40	1·2917	43	24·08
1·0962	16	8·96	1·3000	44	24·64
1·1026	17	9·52	1·3083	45	25·20
1·1091	18	10·08	1·3167	46	25·76
1·1156	19	10·64	1·3252	47	26·32
1·1222	20	11·20	1·3338	48	26·88
1·1288	21	11·76	1·3424	49	27·44
1·1355	22	12·32	1·3511	50	28·00
1·1423	23	12·88	1·3599	51	28·56
1·1491	24	13·44	1·3688	52	29·12
1·1560	25	14·00	1·3779	53	29·68
1·1629	26	14·56	1·3871	54	30·24
1·1699	27	15·12	1·3964	55	30·80
1·1770	28	15·68	1·4057	56	31·36

TABLE SHOWING THE STRENGTH OF SOLUTIONS OF FERROSUM SULPHATE (GREEN VITRIOL, PROTO-SULPHATE OF IRON) BY SPECIFIC GRAVITY AT 17·2° C.

Specific Gravity.	Per cent. of $FeSO_4$ + 7Aq.	Per cent. of $FeSO_4$.	Specific Gravity.	Per cent. of $FeSO_4$ + 7Aq.	Per cent. of $FeSO_4$.
1·0052	1	·547	1·1214	21	11·487
1·0105	2	1·094	1·1278	22	12·034
1·0158	3	1·641	1·1343	23	12·581
1·0212	4	2·188	1·1408	24	13·128
1·0266	5	2·735	1·1473	25	13·675
1·0321	6	3·282	1·1539	26	14·222
1·0377	7	3·829	1·1606	27	14·769
1·0433	8	4·376	1·1673	28	15·316
1·0490	9	4·923	1·1740	29	15·863
1·0547	10	5·470	1·1808	30	16·410
1·0605	11	6·017	1·1876	31	16·957
1·0664	12	6·564	1·1945	32	17·504
1·0723	13	7·111	1·2014	33	18·051
1·0782	14	7·658	1·2084	34	18·598
1·0842	15	8·205	1·2154	35	19·145
1·0903	16	8·752	1·2225	36	19·692
1·0964	17	9·299	1·2296	37	20·239
1·1026	18	9·846	1·2368	38	20·786
1·1088	19	10·393	1·2440	39	21·333
1·1157	20	10·940	1·2513	40	21·880

TABLE SHOWING THE STRENGTH OF SOLUTIONS OF COPPER SULPHATE (BLUE STONE, BLUE VITRIOL) BY SPECIFIC GRAVITY AT 18° C.

Specific Gravity.	Percent. of $CuSO_4 + 5OH_2$.	Per cent. of $CuSO_4$.	Specific Gravity.	Percent. of $CuSO_4 + 5OH_2$.	Per cent. of $CuSO_4$.
1·0063	1	·637	1·1063	16	10·200
1·0126	2	1·275	1·1135	17	10·837
1·0190	3	1·912	1·1208	18	11·474
1·0254	4	2·550	1·1281	19	12·111
1·0319	5	3·187	1·1354	20	12·750
1·0384	6	3·825	1·1427	21	13·387
1·0450	7	4·462	1·1501	22	14·025
1·0516	8	5·100	1·1585	23	14·662
1·0582	9	5·737	1·1659	24	15·300
1·0649	10	6·375	1·1738	25	15·938
1·0716	11	7·012	1·1817	26	16·574
1·0785	12	7·650	1·1898	27	17·211
1·0854	13	8·287	1·1980	28	17·848
1·0923	14	8·925	1·2063	29	18·486
1·0993	15	9·562	1·2146	30	19·125

TABLE SHOWING THE STRENGTH OF SOLUTIONS OF POTASSIUM AND AMMONIUM ALUM BY SPECIFIC GRAVITY AT 17·5° C.

Per cent.	$K_2Al_2(SO_4)_4$ + 24 Aq. Density.	$(NH_4)_2Al_2(SO_4)_4$ + 24 Aq. Density.
1	1·0065	1·0060
2	1·0110	1·0109
3	1·0166	1·0156
4	1·0218	1·0200
5	1·0269	1·0255
6	1·0320	1·0305

TABLE SHOWING THE STRENGTH OF SOLUTIONS OF POTASSIUM CHROMATE (YELLOW CHROMATE) BY SPECIFIC GRAVITY AT 19·5° C.

Specific Gravity.	Per cent. of K_2CrO_4.	Specific Gravity.	Per cent. of K_2CrO_4.	Specific Gravity.	Per cent. of K_2CrO_4.
1·0080	1	1·1287	15	1·2592	28
1·0161	2	1·1380	16	1·2700	29
1·0243	3	1·1474	17	1·2808	30
1·0325	4	1·1570	18	1·2921	31
1·0408	5	1·1667	19	1·3035	32
1·0492	6	1·1765	20	1·3151	33
1·0576	7	1·1864	21	1·3268	34
1·0663	8	1·1964	22	1·3386	35
1·0750	9	1·2066	23	1·3505	36
1·0837	10	1·2169	24	1·3625	37
1·0925	11	1·2274	25	1·3746	38
1·1014	12	1·2379	26	1·3868	39
1·1104	13	1·2485	27	1·3991	40
1·1195	14				

TABLE SHOWING THE STRENGTH OF SOLUTIONS OF POTASSIUM NITRATE (NITRE, SALTPETRE) BY SPECIFIC GRAVITY AT 21° C.

Specific Gravity.	Per cent. of KNO_3.	Specific Gravity.	Per cent. of KNO_3.	Specific Gravity.	Per cent. of KNO_3.
1·0058	1	1·0555	9	1·1097	17
1·0118	2	1·0621	10	1·1169	18
1·0178	3	1·0686	11	1·1242	19
1·0239	4	1·0752	12	1·1316	20
1·0300	5	1·0819	13	1·1390	21
1·0363	6	1·0887	14	1·1464	22
1·0425	7	1·0956	15	1·1538	23
1·0490	8	1·1026	16	1·1613	24

TABLE SHOWING THE STRENGTH OF SOLUTIONS OF SODIUM NITRATE (CHILI NITRE, CHILI SALTPETRE) BY SPECIFIC GRAVITY AT 20·2° C.

Specific Gravity.	Per cent. of $NaNO_3$.	Specific Gravity.	Per cent. of $NaNO_3$.	Specific Gravity.	Per cent. of $NaNO_3$.
1·0065	1	1·1260	18	1·2679	35
1·0131	2	1·1338	19	1·2770	36
1·0197	3	1·1418	20	1·2863	37
1·0264	4	1·1498	21	1·2958	38
1·0332	5	1·1578	22	1·3055	39
1·0399	6	1·1659	23	1·3155	40
1·0468	7	1·1740	24	1·3255	41
1·0537	8	1·1822	25	1·3355	42
1·0606	9	1·1904	26	1·3456	43
1·0676	10	1·1987	27	1·3557	44
1·0746	11	1·2070	28	1·3659	45
1·0817	12	1·2154	29	1·3761	46
1·0889	13	1·2239	30	1·3864	47
1·0962	14	1·2325	31	1·3968	48
1·1035	15	1·2412	32	1·4074	49
1·1109	16	1·2500	33	1·4180	50
1·1184	17	1·2589	34		

TABLE SHOWING THE STRENGTH OF SOLUTIONS OF BARIUM NITRATE (NITRATE OF BARYTA) BY SPECIFIC GRAVITY AT 12·5° C.

Specific Gravity.	Per cent. of $Ba(NO_3)_2$.	Specific Gravity.	Per cent. of $Ba(NO_3)_2$.
1·0062	1	1·0250	4
1·0123	2	1·0320	5
1·0185	3	1·0409	6

TABLE SHOWING THE STRENGTH OF SOLUTIONS OF CALCIUM NITRATE (NITRATE OF LIME) BY SPECIFIC GRAVITY AT 12·5° C.

Specific Gravity.	Per cent. of (Crystallized ?) Salt.	Specific Gravity.	Per cent. of (Crystallized ?) Salt.
1·0052	1	1·0690	14
1·0104	2	1·0777	16
1·0156	3	1·0864	18
1·0208	4	1·0950	20
1·0260	5	1·1044	22
1·0310	6	1·1112	24
1·0361	7	1·1185	26
1·0411	8	1·1257	28
1·0481	9	1·1320	30
1·0510	10	1·1383	32
1·0601	12		

TABLE SHOWING THE STRENGTH OF SOLUTIONS OF COPPER NITRATE AT 12·5° C.

Specific Gravity.	Per cent. of $Cu(NO_3)_2$.	Specific Gravity.	Per cent. of $Cu(NO_3)_2$.
1·0059	1	1·1915	26
1·0119	2	1·2117	28
1·0192	3	1·2320	30
1·0252	4	1·2513	32
1·0320	5	1·2712	34
1·0390	6	1·2912	36
1·0457	7	1·3113	38
1·0526	8	1·3320	40
1·0592	9	1·3533	42
1·0655	10	1·3749	44
1·0778	12	1·3978	46
1·0918	14	1·4206	48
1·1060	16	1·4440	50
1·1201	18	1·4686	52
1·1350	20	1·4944	54
1·1521	22	1·5205	56
1·1716	24		

TABLE SHOWING THE STRENGTH OF SOLUTIONS OF DISODIUM HYDROGEN PHOSPHATE BY SPECIFIC GRAVITY AT 19° C.

Specific Gravity.	Per cent. of Na_2HPO_4+ 12Aq.	Per cent. of Na_2HPO_4.	Specific Gravity.	Per cent. of Na_2HPO_4+ 12Aq.	Per cent. of Na_2HPO_4.
1·0041	1	·397	1·0292	7	2·779
1·0083	2	·794	1·0332	8	3·176
1·0125	3	1·191	1·0376	9	3·573
1·0166	4	1·588	1·0418	10	3·970
1·0208	5	1·985	1·0460	11	4·367
1·0250	6	2·382	1·0503	12	4·764

TABLE SHOWING THE STRENGTH OF SOLUTIONS OF LEAD NITRATE AT 17·5° C.

Specific Gravity.	Per cent. of $Pb(NO_3)_2$.	Specific Gravity.	Per cent. of $Pb(NO_3)_2$.	Specific Gravity.	Per cent. of $Pb(NO_3)_2$.
1·0080	1	1·1157	13	1·2495	25
1·0163	2	1·1257	14	1·2620	26
1·0247	3	1·1359	15	1·2747	27
1·0331	4	1·1463	16	1·2876	28
1·0416	5	1·1569	17	1·3007	29
1·0502	6	1·1677	18	1·3140	30
1·0591	7	1·1788	19	1·3276	31
1·0682	8	1·1902	20	1·3416	32
1·0775	9	1·2016	21	1·3558	33
1·0869	10	1·2132	22	1·3702	34
1·0963	11	1·2251	23	1·3848	35
1·1059	12	1·2372	24	1·3996	36

TABLE SHOWING THE STRENGTH OF SOLUTIONS OF POTASSIUM CHLORIDE BY SPECIFIC GRAVITY AT 15° C.

Water at 15° C. = 1.

Specific Gravity.	Per cent. of KCl.	Specific Gravity.	Per cent. of KCl.	Specific Gravity.	Per cent. of KCl.
1·00650	1	1·06580	10	1·12179	18
1·01300	2	1·07271	11	1·12894	19
1·01950	3	1·07962	12	1·13608	20
1·02600	4	1·08652	13	1·14348	21
1·03250	5	1·09345	14	1·15088	22
1·03916	6	1·10036	15	1·15828	23
1·04582	7	1·10750	16	1·16568	24
1·05248	8	1·11465	17	1·17234	24·9
1·05914	9				

TABLE SHOWING THE STRENGTH OF SOLUTIONS OF SODIUM CHLORIDE (COMMON SALT) BY SPECIFIC GRAVITY AT 15° C.

Specific Gravity.	Per cent. of NaCl.	Specific Gravity.	Per cent. of NaCl.	Specific Gravity.	Per cent. of NaCl.
1·00725	1	1·07335	10	1·14315	19
1·01450	2	1·08097	11	1·15107	20
1·02174	3	1·08859	12	1·15931	21
1·02899	4	1·09622	13	1·16755	22
1·03624	5	1·10384	14	1·17580	23
1·04366	6	1·11146	15	1·18404	24
1·05108	7	1·11938	16	1·19228	25
1·05851	8	1·12730	17	1·20098	26
1·06593	9	1·13523	18	1·20433	26·395

TABLE SHOWING THE STRENGTH OF SOLUTIONS OF AMMONIUM CHLORIDE BY SPECIFIC GRAVITY AT 15° C.

Specific Gravity.	Per cent. of NH_4Cl.	Specific Gravity.	Per cent. of NH_4Cl.	Specific Gravity.	Per cent. of NH_4Cl.
1·00316	1	1·03081	10	1·05648	19
1·00632	2	1·03370	11	1·05929	20
1 00948	3	1·03658	12	1·06204	21
1·01264	4	1·03947	13	1·06479	22
1·01580	5	1·04325	14	1·06754	23
1·01880	6	1·04524	15	1·07029	24
1·02180	7	1·04805	16	1·07304	25
1·02481	8	1·05086	17	1·07575	26
1·02781	9	1·05367	18	1·07658	26·297

TABLE SHOWING THE STRENGTH OF SOLUTIONS OF MAGNESIUM CHLORIDE BY SPECIFIC GRAVITY AT 15° C.

Specific Gravity.	Per cent. of $MgCl_2$.	Specific Gravity.	Per cent. of $MgCl_2$.	Specific Gravity.	Per cent. of $MgCl_2$.
1·00844	1	1·11300	13	1·22737	25
1·01689	2	1·12203	14	1·23777	26
1·02533	3	1·13106	15	1·24817	27
1·03378	4	1·14045	16	1·25857	28
1·04222	5	1·14984	17	1·26897	29
1·05096	6	1·15922	18	1·27937	30
1·05970	7	1·16861	19	1·29029	31
1·06844	8	1·17800	20	1·30121	32
1·07718	9	1·18787	21	1·31213	33
1·08592	10	1·19775	22	1·32305	34
1·09495	11	1·20762	23	1·33397	35
1·10398	12	1·21750	24	1·33406	35·008

TABLE SHOWING THE STRENGTH OF SOLUTIONS OF BARIUM CHLORIDE BY SPECIFIC GRAVITY AT 21·5° C.

Specific Gravity.	Per cent. of $BaCl_2+2Aq$.	Per cent. of $BaCl_2$.	Specific Gravity.	Per cent. of $BaCl_2+2Aq$.	Per cent. of $BaCl_2$.
1·0073	1	·853	1·1302	16	13·641
1·0147	2	1·705	1·1394	17	14·494
1·0222	3	2·558	1·1488	18	15·346
1·0298	4	3·410	1·1584	19	16·199
1·0374	5	4·263	1·1683	20	17·051
1·0452	6	5·115	1·1783	21	17·904
1·0530	7	5·968	1·1884	22	18·756
1·0610	8	6·821	1·1986	23	19·609
1·0692	9	7·673	1·2090	24	20·461
1·0776	10	8·526	1·2197	25	21·314
1·0861	11	9·379	1·2304	26	22·166
1·0947	12	10·231	1·2413	27	23·019
1·1034	13	11·084	1·2523	28	23·871
1·1122	14	11·936	1·2636	29	24·724
1·1211	15	12·789	1·2750	30	25·577

TABLE SHOWING THE STRENGTH OF SOLUTIONS OF CALCIUM CHLORIDE BY SPECIFIC GRAVITY AT 15° C.

Specific Gravity.	Per cent. of $CaCl_2$.	Specific Gravity.	Per cent. of $CaCl_2$.	Specific Gravity.	Per cent. of $CaCl_2$.
1·00852	1	1·13360	15	1·27704	29
1·01704	2	1·14332	16	1·28789	30
1·02555	3	1·15305	17	1·29917	31
1·03407	4	1·16277	18	1·31045	32
1·04259	5	1·17250	19	1·32174	33
1·05146	6	1·18222	20	1·33302	34
1·06033	7	1·19251	21	1·34430	35
1·06921	8	1·20279	22	1·35610	36
1·07808	9	1·21308	23	1·36790	37
1·08695	10	1·22336	24	1·37970	38
1·09628	11	1·23365	25	1·39150	39
1·10561	12	1·24450	26	1·40330	40
1·11494	13	1·25535	27	1·41104	40·66
1·12427	14	1·26619	28		

TABLE SHOWING THE STRENGTH OF SOLUTIONS OF ALUMINIUM CHLORIDE BY SPECIFIC GRAVITY AT 15° C.

Specific Gravity.	Per cent. of Al_2Cl_6.	Specific Gravity.	Per cent. of Al_2Cl_6.
1·00721	1	1·17092	22
1·01443	2	1·17953	23
1·02164	3	1·18815	24
1·02885	4	1·19676	25
1·03603	5	1·20584	26
1·04353	6	1·21493	27
1·05099	7	1·22406	28
1·05845	8	1·23310	29
1·06591	9	1·24219	30
1·07337	10	1·25184	31
1·08120	11	1·26149	32
1·08902	12	1·27115	33
1·09684	13	1·28080	34
1·10466	14	1·29046	35
1·11248	15	1·30066	36
1·12073	16	1·31086	37
1·12897	17	1·32106	38
1·13721	18	1·33126	39
1·14545	19	1·34146	40
1·15370	20	1·35224	41
1·16231	21	1·35359	41·126

TABLE SHOWING THE STRENGTH OF SOLUTIONS OF ZINC CHLORIDE BY SPECIFIC GRAVITY AT 12·5° C.

Specific Gravity.	Per cent. of the Crystallized Salt.	Specific Gravity.	Per cent. of the Crystallized Salt.	Specific Gravity.	Per cent. of the Crystallized Salt.
1·0144	2	1·1614	28	1·3402	54
1·0228	4	1·1730	30	1·3567	56
1·0342	6	1·1864	32	1·3733	58
1·0458	8	1·1967	34	1·3900	60
1·0573	10	1·2106	36	1·4071	62
1·0687	12	1·2228	38	1·4253	64
1·0802	14	1·2360	40	1·4457	66
1·0966	16	1·2497	42	1·4675	68
1·1033	18	1·2639	44	1·4900	70
1·1150	20	1·2783	46	1·5164	72
1·1267	22	1·2927	48	1·5427	74
1·1382	24	1·3070	50	1·5700	76
1·1498	26	1·3244	52	1·5987	78

TABLE SHOWING THE STRENGTH OF SOLUTIONS OF GLYCERINE BY SPECIFIC GRAVITY.

Glycerine per cent.	Specific Gravity.	Freezing Point.	Glycerine per cent.	Specific Gravity.	Freezing Point.
10	1·024	− 1° C.	60	1·159	below −35
20	1·051	− 2·5	70	1·179	
30	1·075	− 6	80	1·204	
40	1·105	−17·5	90	1·232	
50	1·127	−31·34	100	1·241	

TABLE SHOWING THE STRENGTH OF SOLUTIONS OF POTASSIUM IODIDE BY SPECIFIC GRAVITY AT 21° C.

Specific Gravity.	Per cent. of KI.	Specific Gravity.	Per cent. of KI.	Specific Gravity.	Per cent. of KI.
1·0075	1	1·1807	21	1·4224	41
1·0151	2	1·1911	22	1·4371	42
1·0227	3	1·2016	23	1·4520	43
1·0305	4	1·2122	24	1·4671	44
1·0384	5	1·2229	25	1·4825	45
1·0464	6	1·2336	26	1·4982	46
1·0545	7	1·2445	27	1·5142	47
1·0627	8	1·2556	28	1·5305	48
1·0710	9	1·2699	29	1·5471	49
1·0793	10	1·2784	30	1·5640	50
1·0877	11	1·2899	31	1·5810	51
1·0962	12	1·3017	32	1·5984	52
1·1048	13	1·3138	33	1·6162	53
1·1136	14	1·3262	34	1·6343	54
1·1226	15	1·3389	35	1·6528	55
1·1318	16	1·3519	36	1·6717	56
1·1412	17	1·3653	37	1·6911	57
1·1508	18	1·3791	38	1·7109	58
1·1605	19	1·3933	39	1·7311	59
1·1705	20	1·4079	40	1·7517	60

TABLE SHOWING THE STRENGTH OF SOLUTIONS OF SODIUM THIOSULPHATE (HYPOSULPHITE OF SODA) BY SPECIFIC GRAVITY AT 19° C.

Specific Gravity.	Per cent. of $Na_2S_2O_3$ + 5Aq.	Per cent. of $Na_2S_2O_3$.	Specific Gravity.	Per cent. of $Na_2S_2O_3$ + 5Aq.	Per cent. of $Na_2S_2O_3$.
1·0052	1	0·637	1·1440	26	16·564
1·0105	2	1·274	1·1499	27	17·201
1·0158	3	1·911	1·1558	28	17·838
1·0211	4	2·584	1·1617	29	18·475
1·0264	5	3·185	1·1676	30	19·113
1·0317	6	3·822	1·1738	31	19·750
1·0370	7	4·459	1·1800	32	20·387
1·0423	8	5·096	1·1862	33	21·024
1·0476	9	5·733	1·1924	34	21·661
1·0529	10	6·371	1·1986	35	22·298
1·0584	11	7·008	1·2048	36	22·935
1·0639	12	7·645	1·2110	37	23·572
1·0695	13	8·282	1·2172	38	24·209
1·0751	14	8·919	1·2234	39	24·846
1·0807	15	9·556	1·2297	40	25·484
1·0863	16	10·193	1·2362	41	26·121
1·0919	17	10·830	1·2427	42	26·758
1·0975	18	11·467	1·2492	43	27·395
1·1031	19	12·105	1·2558	44	28·032
1·1087	20	12·742	1·2624	45	28·669
1·1145	21	13·379	1·2690	46	29·306
1·1204	22	14·016	1·2756	47	29·943
1·1263	23	14·653	1·2822	48	30·580
1·1322	24	15·290	1·2888	49	31·218
1·1381	25	15·927	1·2954	50	31·855

TABLE SHOWING THE STRENGTH OF SOLUTIONS OF SODIUM ACETATE BY SPECIFIC GRAVITY AT 12·5° C.

Specific Gravity.	Per cent. of the Salt.	Specific Gravity.	Per cent. of the Salt.	Specific Gravity.	Per cent. of the Salt.
1·0028	1	1·0361	12	1·1018	32
1·0058	2	1·0424	14	1·1090	34
1·0087	3	1·0488	16	1·1165	36
1·0117	4	1·0553	18	1·1242	38
1·0146	5	1·0619	20	1·1320	40
1·0176	6	1·0685	22	1·1399	42
1·0206	7	1·0751	24	1·1482	44
1·0237	8	1·0817	26	1·1567	46
1·0267	9	1·0883	28	1·1656	48
1·0299	10	1·0955	30	1·1755	50

TABLE SHOWING THE STRENGTH OF SOLUTIONS OF LEAD ACETATE (SUGAR OF LEAD) BY SPECIFIC GRAVITY AT 12·5° C.

Specific Gravity.	Per cent. of the Salt.	Specific Gravity.	Per cent. of the Salt.	Specific Gravity.	Per cent. of the Salt.
1·0070	1	1·0505	7	1·1221	16
1·0140	2	1·0580	8	1·1330	18
1·0211	3	1·0655	9	1·1560	20
1·0283	4	1·0731	10	1·1740	22
1·0366	5	1·0891	12	1·1928	24
1·0430	6	1·1055	14		

TABE SHOWING THE STRENGTH OF SOLUTIONS OF POTASSIUM FERROCYANIDE (YELLOW PRUSSIATE OF POTASH) BY SPECIFIC GRAVITY AT 15° C.

Specific Gravity.	Per cent. of K_4FeCy_6+3Aq.	Per cent. of K_4FeCy_6.	Specific Gravity.	Per cent. of K_4FeCy_6+3Aq.	Per cent. of K_4FeCy_6.
1·0058	1	0·872	1·0669	11	9·592
1·0116	2	1·744	1·0734	12	10·464
1·0175	3	2·616	1·0800	13	11·336
1·0234	4	3·488	1·0866	14	12·208
1·0295	5	4·360	1·0932	15	13·080
1·0356	6	5·232	1·0999	16	13·952
1·0417	7	6·104	1·1067	17	14·824
1·0479	8	6·976	1·1136	18	15·696
1·0542	9	7·848	1·1205	19	16·568
1·0605	10	8·720	1·1275	20	17·440

TABLE SHOWING THE STRENGTH OF SOLUTIONS OF POTASSIUM FERRICYANIDE (RED PRUSSIATE OF POTASH) BY SPECIFIC GRAVITY AT 13° C.

Specific Gravity.	Per cent. of $K_6Fe_2Cy_{12}$.	Specific Gravity.	Per cent. of $K_6Fe_2Cy_{12}$.
1·0051	1	1·0653	12
1·0103	2	1·0771	14
1·0155	3	1·0891	16
1·0208	4	1·1014	18
1·0261	5	1·1139	20
1·0315	6	1·1266	22
1·0370	7	1·1396	24
1·0426	8	1·1529	26
1·0482	9	1·1664	28
1·0538	10	1·1802	30

TABLE SHOWING THE STRENGTH OF SOLUTIONS OF HYDROCYANIC ACID (PRUSSIC ACID) BY SPECIFIC GRAVITY.

Specific Gravity.	Per cent. of HCy.	Specific Gravity.	Per cent. of HCy.
·9570	16·0	·9945	3·6
·9768	10·6	·9952	3·2
·9815	9 1	·9958	3·0
·9840	8·0	·9964	2·7
·9870	7·3	·9967	2·5
·9890	6·4	·9970	2·3
·9900	5·8	·9973	2·1
·9914	5·3	·9974	2·0
·9923	5·0	·9975	1·77
·9930	4·6	·9978	1·68
·9940	4·0	·9979	1·60

Table showing the Strength of Alcoholic Solutions of Ether by Specific Gravity.

Specific Gravity.	Ether, per cent.	Specific Gravity.	Ether, per cent.	Specific Gravity.	Ether, per cent.
·720	100	·768	60	·816	20
·732	90	·780	50	·828	10
·744	80	·792	40	·830	0
·756	70	·804	30		

Table showing the Strength of Solutions of Albumin.

Per cent.	Specific Gravity.	Per cent.	Specific Gravity.	Per cent.	Specific Gravity.
5	1·013	20	1·052	40	1·106
10	1·026	30	1·078	60	1·135

Solubility of Lime in Solutions of Sugar.

Sugar in 100 parts of Water.	Density of Syrup.	Density after saturation with Lime.	100 Parts of the Residue dried at 120° C. contain	
			Lime.	Sugar.
40	1·122	1·179	21	79
35	1·110	1·166	20·5	79·5
30	1·096	1·148	20·1	79·9
25	1·082	1·128	19·8	80·2
20	1·068	1·104	18·8	81·2
15	1·052	1·080	18·5	81·5
10	1·036	1·053	18·1	81·9
5	1·018	1·026	15·3	84·7

Table for Correction of Volumes of Gases for Temperature according to the Formula

$$V^{1} = \frac{V \times B}{760 \times (1 + \delta t)}.$$

$1 + \delta t$ from 0° to 30°. $\delta = 0 \cdot 003665$.

t	$1 + \delta t$.	Log. $(1 + \delta t)$.	t	$1 + \delta t$.	Log. $(1 + \delta t)$.
°			°		
0·0	1·0000000	0·0000000	2·6	1·0095290	0·0041188
·1	1·0003665	1591	·7	1·0098955	2765
·2	1·0007330	3182	·8	1·0102620	4341
·3	1·0010995	4772	2·9	1·0106285	5916
·4	1·0014660	6362	3·0	1 0109950	0·0047490
0·5	1·0018325	7951	·1	1·0113615	9063
·6	1·0021990	9519	·2	1·0117280	0·0050636
·7	1·0025655	0·0011127	·3	1·0120945	2210
·8	1·0029320	2714	·4	1·0124610	3782
·9	1·0032985	4301	3·5	1·0128275	5354
1·0	1·0036650	0·0015888	·6	1·0131940	6926
·1	1·0040315	7474	·7	1·0135605	8497
·2	1·0043980	9059	·8	1·0139270	0·0060067
·3	1·0047645	0·0020643	3·9	1·0142935	1636
·4	1·0051310	2227	4·0	1·0146600	0·0063205
1·5	1·0054975	3810	·1	1·0150265	4773
·6	1·0058640	5393	·2	1·0153930	6341
·7	1·0062305	6974	·3	1·0157595	7909
·8	1·0065970	8556	·4	1·0161260	9476
1·9	1·0069635	0·0030137	4·5	1·0164925	0·0071042
2·0	1·0073300	0·0031718	·6	1·0168590	2607
·1	1·0076965	3298	·7	1·0172255	4172
·2	1·0080630	4877	·8	1·0175920	5736
·3	1·0084295	6455	4·9	1·0179585	7300
·4	1·0087960	8033	5·0	1·0183250	0·0078864
2·5	1·0091625	9611	·1	1·0186915	0·0080427

TABLE FOR CORRECTION OF VOLUMES OF GASES—*continued.*

t	$1 + \delta t$.	Log. $(1 + \delta t)$.	t	$1 + \delta t$.	Log. $(1 + \delta t)$
°			°		
5·2	1·0190580	0·0081989	8·3	1·0304195	0·0130141
·3	1·0194245	4551	·4	1·0307860	1685
·4	1·0197910	5112	8·5	1·0311525	3229
5·5	1·0201575	6672	·6	1·0315190	4772
·6	1·0205240	8232	·7	1·0318855	6315
·7	1·0208905	9791	·8	1·0322520	7857
·8	1·0212570	0·0091350	8·9	1·0326185	9399
5·9	1·0216235	2908	9·0	1·0329850	0·0140940
6·0	1·0219900	0·0094466	·1	1·0333515	2481
·1	1·0223565	6023	·2	1·0337180	4021
·2	1·0227230	7580	·3	1·0340845	5561
·3	1·0230895	9136	·4	1·0344510	7100
·4	1·0234560	0·0100692	9·5	1·0348175	8638
6·5	1·0238225	2247	·6	1·0351840	0·0150175
·6	1·0241890	3802	·7	1·0355505	1712
·7	1·0245555	5356	·8	1·0359170	3249
·8	1·0249220	6909	9·9	1·0362835	4785
·9	1·0252885	8461	10·0	1·0366500	0·0156321
7·0	1·0256550	0·0110013	·1	1·0370165	7857
·1	1·0260215	1565	·2	1·0373830	9392
·2	1·0263880	3116	·3	1·0377495	0·0160926
·3	1·0267545	4666	·4	1·0381160	2459
·4	1·0271210	6216	10·5	1·0384825	3992
7·5	1·0274875	7765	·6	1·0388490	5524
·6	1·0278540	9314	·7	1·0392155	7056
·7	1·0282205	0·0120862	·8	1·0395820	8587
·8	1·0285870	2410	10·9	1·0399485	0·0170118
7·9	1·0289535	3957	11·0	1·0403150	0·0171648
8·0	1·0293200	0·0125504	·1	1·0406815	3178
·1	1·0296865	7050	·2	1·0410480	4707
·2	1·0300530	8596	·3	1·0414145	6236

TABLE FOR CORRECTION OF VOLUMES OF GASES—*continued.*

t	1 + δ t.	Log. (1+δ t).	t	1 + δ t.	Log. (1+δ t).
°			°		
11·4	1·0417810	0·0177764	14·5	1·0531425	0·0224871
11·5	1·0421475	9292	·6	1·0535090	6382
·6	1·0425140	0·0180819	·7	1·0538755	7893
·7	1·0428805	2346	·8	1·0542420	9403
·8	1·0432470	3872	14·9	1·0546085	0·0230193
11·9	1·0436135	5397	15·0	1·0549750	0·0232422
12·0	1·0439800	0·0186922	·1	1·0553415	3930
·1	1·0443465	8446	·2	1·0557080	5438
·2	1·0447130	9970	·3	1·0560745	6945
·3	1·0450795	0·0191493	·4	1·0564410	8452
·4	1·0454460	3016	15·5	1·0568075	9959
12·5	1·0458125	4538	·6	1·0571740	0·0241465
·6	1·0461790	6060	·7	1·0575405	2970
·7	1·0465455	7581	·8	1·0579070	4475
·8	1·0469120	9102	15·9	1·0582735	5979
12·9	1·0472785	0·0200622	16·0	1·0586400	0·0247483
13·0	1·0476450	0·0202141	·1	1·0590065	8986
·1	1·0480115	3660	·2	1·0593730	0·0250489
·2	1·0483780	5179	·3	1·0597395	1991
·3	1·0487445	6697	·4	1·0601060	3492
·4	1·0491110	8214	16·5	1·0604725	4993
13·5	1·0494775	9731	·6	1·0608390	6494
·6	1·0498440	0·0211248	·7	1·0612055	7994
·7	1·0502105	2764	·8	1·0615720	9494
·8	1·0505770	4279	16·9	1·0619385	0·0260993
13·9	1·0509435	5794	17·0	1·0623050	0·0262492
14·0	1·0513100	0·0217308	·1	1·0626715	3990
·1	1·0516765	8821	·2	1·0630380	5488
·2	1·0520430	0·0220334	·3	1·0634045	6985
·3	1·0524095	1847	·4	1·0637710	8482
·4	1·0527760	3359	17·5	1·0641375	9978

TABLE FOR CORRECTION OF VOLUMES OF GASES—*continued.*

t	$1 + \delta t$.	Log. $(1+\delta t)$.	t	$1 + \delta t$.	Log. $(1+\delta t)$.
°			°		
17·6	1·0645040	0·0271474	20·7	1·0758655	0·0317580
·7	1 0648705	2968	·8	1·0762320	9058
·8	1 0652370	4462	20·9	1·0765985	0·0320538
17·9	1·0656035	5956	21·0	1·0769650	0·0322016
18·0	1·0659700	0·0277450	·1	1·0773315	3493
·1	1·0663365	8943	·2	1·0776980	4971
·2	1·0667030	0·0280435	·3	1·0780645	6447
·3	1·0670695	1927	·4	1·0784310	7924
·4	1·0674360	3418	21·5	1·0787975	9399
18·5	1·0678025	4909	·6	1·0791640	0·0330874
·6	1·0681690	6399	·7	1·0795305	2349
·7	1·0685355	7889	·8	1·0798970	3824
·8	1·0689020	9379	21·9	1·0802635	5298
18·9	1·0692685	0·0290868	22·0	1·0806300	0·0336771
19·0	1·0696350	0 0292356	·1	1·0809965	8244
·1	1·0700015	3844	·2	1·0813630	9716
·2	1·0703680	5331	·3	1·0817295	0·0341187
·3	1·0707345	6818	·4	1·0820960	2658
·4	1·0711010	8304	22·5	1·0824625	4129
19·5	1·0714675	9790	·6	1·0828290	5599
·6	1·0718340	0·0301275	·7	1·0831955	7069
·7	1·0722005	2760	·8	1·0835620	8538
·8	1·0725670	4244	22·9	1·0839285	0·0350007
19·9	1·0729335	5728	23·0	1·0842950	0·0351475
20·0	1·0730000	0·0307211	·1	1·0846615	2943
·1	1·0736665	8694	·2	1·0850280	4410
·2	1·0740330	0·0310176	·3	1·0853945	5877
·3	1·0743995	1658	·4	1·0857610	7343
·4	1·0747660	3139	23·5	1·0861275	8809
20·5	1·0751325	4620	·6	1·0864940	0·0360274
·6	1·0754990	6100	·7	1·0868605	1739

TABLE FOR CORRECTION OF VOLUMES OF GASES—*continued*

t	$1+\delta t$.	Log. $(1+\delta t)$.	t	$1+\delta t$.	Log. $(1+\delta t)$.
°			°		
23·8	1·0872270	0·0363203	27·0	1·0989550	0·0409800
23·9	1·0875935	4666	·1	1·0993215	0·0411248
24·0	1·0879600	0·0366129	·2	1·0996880	2696
·1	1·0883265	7592	·3	1·1000545	4143
·2	1·0886930	9054	·4	1·1004210	5589
·3	1·0890595	0·0370516	27·5	1·1007875	7035
·4	1·0894260	1978	·6	1·1011540	8481
24·5	1·0897925	3439	·7	1·1015205	9926
·6	1·0901590	4899	·8	1·1018870	0·0421371
·7	1·0905255	6359	27·9	1·1022535	2815
·8	1·0908920	7818	28·0	1·1026200	0·0424259
24·9	1·0912585	9276	·1	1·1029865	5702
25·0	1·0916250	0·0380734	·2	1·1033530	7145
·1	1·0919915	2192	·3	1·1037195	8587
·2	1·0923580	3649	·4	1·1040860	0·0430029
·3	1·0927245	5106	28·5	1·1044525	1470
·4	1·0930910	6563	·6	1·1048190	2911
25·5	1·0934575	8019	·7	1·1051855	4352
·6	1·0938240	9474	·8	1·1055520	5792
·7	1·0941905	0·0390929	28·9	1·1059185	7232
·8	1·0945570	2384	29·0	1·1062850	0·0438671
25·9	1·0949235	3838	·1	1·1066515	0·0440110
26·0	1·0952900	0·0395291	·2	1·1070180	1548
·1	1·0956565	6744	·3	1·1073845	2986
·2	1·0960230	8197	·4	1·1077510	4423
·3	1·0963895	9649	29·5	1·1081175	5859
·4	1·0967560	0·0401101	·6	1·1084840	7295
26·5	1·0971225	2552	·7	1·1088505	8730
·6	1·0974890	4003	·8	1·1092170	0·0450165
·7	1·0978555	5453	29·9	1·1095835	1600
·8	1·0982220	6902			
26·9	1·0985885	8351	30·0	1·1099500	0·0453035

TABLE FOR CORRECTION OF VOLUMES OF GASES FOR TEMPERATURE, GIVING THE DIVISOR FOR THE FORMULA

$$V^1 = \frac{V \times B}{760 \times (1 + \delta t)}.$$

t	$760 \times (1 + \delta t)$.	Log. [$760 \times (1 + \delta t)$].	t	$760 \times (1 + \delta t)$.	Log. [$760 \times (1 + \delta t)$].
°			°		
0·0	760·0000	2·8808136	2·6	767·2420	2·8849324
·1	760·2785	9727	·7	767·5206	2·8850901
·2	760·5571	2·8811318	·8	767·7991	2477
·3	760·8356	2908	·9	768·0777	4052
·4	761·1142	4498	3·0	768·3562	2·8855626
0·5	761·3927	6087	·1	768·6347	7199
·6	761·6712	7675	·2	768·9133	8772
·7	761·9498	9263	·3	769·1918	2·8860345
·8	762·2283	2·8820850	·4	769·4704	1918
·9	762·5069	2437	3·5	769·7489	3490
1·0	762·7854	2·8824024	·6	770·0274	5062
·1	763·0639	5610	·7	770·3060	6633
·2	763·3425	7195	·8	770·5845	8203
·3	763·6210	8779	·9	770·8631	9772
·4	763·8996	2·8830363	4·0	771·1416	2·8871341
1·5	764·1781	1946	·1	771·4201	2909
·6	764·4566	3528	·2	771·6987	4477
·7	764·7352	5111	·3	771·9772	6045
·8	765·0137	6692	·4	772·2558	7612
·9	765·2923	8273	4·5	772·5343	9178
2·0	765·5708	2·8839854	·6	772·8128	2·8880743
·1	765·8493	2·8841434	·7	773·0914	2308
·2	766·1279	3013	·8	773·3699	3872
·3	766·4064	4591	·9	773·6485	5436
·4	766·6850	6169	5·0	773·9270	2·8887000
2·5	766·9635	7747	·1	774·2055	8563

TABLE FOR CORRECTION OF VOLUMES OF GASES—*continued.*

t	$760 \times (1 + \delta t)$.	Log. $[760 \times (1 + \delta t)]$.	t	$760 \times (1 + \delta t)$.	Log. $[760 \times (1 + \delta t)]$.
°			°		
5·2	774·4841	2·8890125	8·3	783·1188	2·8938277
·3	774·7626	1687	·4	783·3974	9821
·4	775·0412	3248	8·5	783·6959	2·8941365
5·5	775·3197	4808	·6	783·9544	2908
·6	775·5982	6368	·7	784·2330	4451
·7	775·8768	7927	·8	784·5115	5993
·8	776·1553	9486	·9	784·7901	7535
·9	776·4339	2·8901044	9·0	785·0686	2·8949076
6·0	776·7124	2·8902602	·1	785·3471	2·8950617
·1	776·9909	4159	·2	785·6257	2157
·2	777·2695	5716	·3	785·9042	3697
·3	777·5480	7272	·4	786·1828	5236
·4	777·8266	8828	9·5	786·4613	6774
6·5	778·1051	2·8910383	·6	786·7398	8311
·6	778·3836	1938	·7	787·0184	9848
·7	778·6622	3492	·8	787·2969	2·8961385
·8	778·9407	5045	·9	787·5755	2921
·9	779·2193	6597	10·0	787·8540	2·8964457
7·0	779·4978	2·8918149	·1	788·1325	5993
·1	779·7763	9701	·2	788·4111	7528
·2	780·0549	2·8921252	·3	788·6896	9062
·3	780·3334	2802	·4	788·9682	2·8970595
·4	780·6120	4352	10·5	789·2467	2128
7·5	780·8905	5901	·6	789·5252	3660
·6	781·1690	7450	·7	789·8038	5192
·7	781·4476	8998	·8	790·0823	6723
·8	781·7261	2·8930546	·9	790·3609	8254
·9	782·0047	2093	11·0	790·6394	2·8979784
8·0	782·2832	2·8933640	·1	790·9179	2·8981314
·1	782·5617	5186	·2	791·1965	2843
·2	782·8403	6732	·3	791·4750	4372

TABLE FOR CORRECTION OF VOLUMES OF GASES—*continued.*

t	$760 \times (1 + \delta t)$.	Log. $[760 \times (1 + \delta t)]$.	t	$760 \times (1 + \delta t)$.	Log. $[760 \times (1 + \delta t)]$.
°			°		
11·4	791·7536	2·8985900	14·5	800·3883	2·9033007
11·5	792·0321	7428	·6	800·6668	4518
·6	792·3106	8955	·7	800·9454	6029
·7	792·5892	2·8990482	·8	801·2239	7539
·8	792·8677	2008	·9	801·5025	9049
·9	793·1463	3533	15·0	801·7810	2·9040558
12·0	793·4248	2·8995058	·1	802·0595	2066
·1	793·7033	6582	·2	802·3381	3574
·2	793·9819	8106	·3	802·6166	5081
·3	794·2604	9629	·4	802·8952	6588
·4	794·5390	2·9001152	15·5	803·1737	8095
12·5	794·8175	2674	·6	803·4522	9601
·6	795·0960	4196	·7	803·7308	2·9051106
·7	795·3746	5717	·8	804·0093	2611
·8	795·6531	7238	·9	804·2879	4115
·9	795·9317	8758	16·0	804·5664	2·9055619
13·0	796·2102	2·9010277	·1	804·8449	7122
·1	796·4887	1796	·2	805·1235	8625
·2	796·7673	3315	·3	805·4020	2·9060127
·3	797·0458	4833	·4	805·6806	1628
·4	797·3244	6350	16·5	805·9591	2·9063129
13·5	797·6029	7867	·6	806·2376	4630
·6	797·8814	9384	·7	806·5162	6130
·7	798·1600	2·9020900	·8	806·7947	7630
·8	798·4385	2415	·9	807·0733	9129
·9	798·7171	3930	17·0	807·3518	2·9070628
14·0	798·9956	2·9025444	·1	807·6303	2126
·1	799·2741	6957	·2	807·9089	3624
·2	799·5527	8470	·3	808·1874	5121
·3	799·8312	9983	·4	808·4660	6618
·4	800·1098	2·9031495	17·5	808·7445	8114

TABLE FOR CORRECTION OF VOLUMES OF GASES—*continued.*

t	$760 \times (1 + \delta t)$.	Log. $[760 \times (1 + \delta t)]$.	t	$760 \times (1 + \delta t)$.	Log. $[760 \times (1 + \delta t)]$.
°			°		
17·6	809·0230	2·9079609	20·7	817·6578	2·9125716
·7	809·3016	2·9081104	·8	817·9363	7195
·8	809·5801	2598	·9	818·2149	8674
·9	809·8587	4092	21·0	818·4934	2·9130152
18·0	810·1372	2·9085586	·1	818·7719	1630
·1	810·4175	7079	·2	819·0505	3107
·2	810·6943	8571	·3	819·3290	4583
·3	810·9728	2·9090063	·4	819·6076	6059
·4	811·2514	1554	21·5	819·8861	7535
18·5	811·5299	3045	·6	820·1646	9010
·6	811·8084	4535	·7	820·4432	2·9140485
·7	812·0870	6025	·8	820·7217	1960
·8	812·3655	7515	·9	821·0003	3434
·9	812·6441	9004	22·0	821·2788	2·9144907
19·0	812·9226	2·9100492	·1	821·5573	6380
·1	813·2011	1980	·2	821·8859	7852
·2	813·4797	3467	·3	822·1144	9323
·3	813·7582	4954	·4	822·3930	2·9150794
·4	814·0368	6440	22·5	822·6715	2265
19·5	814·3153	7926	·6	822·9500	3735
·6	814·5938	9411	·7	823·2286	5205
·7	814·8724	2·9110896	·8	823·5071	6674
·8	815·1500	2380	·9	823·7857	8143
·9	815·4925	3864	23·0	824·0642	2·9159611
20·0	815·7080	2·9115347	·1	824·3427	2·9161079
·1	815·9865	6830	·2	824·6213	2546
·2	816·2651	8312	·3	824·8998	4013
·3	816·5436	9794	·4	825·1784	5479
·4	816·8222	2·9121275	23·5	825·4569	6945
20·5	817·1007	2756	·6	825·7354	8410
·6	817·3792	4236	·7	826·0140	9875

TABLE FOR CORRECTION OF VOLUMES OF GASES—*continued.*

t	760 × (1 + δ t).	Log. [760 × (1 + δ t)].	t	760 × (1 + δ t).	Log. [760 × (1 + δ t)].
°			°		
23·8	826·2925	2·9171339	27·0	835·2058	2·9217936
·9	826·5711	2802	·1	835·4843	9384
24·0	826·8496	2·9174265	·2	835·7629	2·9220832
·1	827·1281	5728	·3	836·0414	2279
·2	827·4067	7190	·4	836·3200	3725
·3	827·6852	8652	27·5	836·5985	5171
·4	827·9638	2·9180114	·6	836·8770	6617
24·5	828·2423	1575	·7	837·1556	8062
·6	828·5208	3035	·8	837·4341	9507
·7	828·7994	4495	·9	837·7127	2·9230951
·8	829·0779	5954	28·0	837·9912	2·9232395
·9	829·3565	7412	·1	838·2697	3838
25·0	829·6350	2·9188870	·2	838·5483	5281
·1	829·9135	2·9190328	·3	838·8268	6723
·2	830·1921	1785	·4	839·1054	8165
·3	830·4706	3242	28·5	839·3839	2·9239606
·4	830·7492	4699	·6	839·6624	2·9241047
25·5	831·0277	2·9196155	·7	839·9410	2488
·6	831·3062	7610	·8	840·2195	3928
·7	831·5848	9065	·9	840·4981	5368
·8	831·8633	2·9200520	29·0	840·7766	2·9246807
·9	832·1419	1974	·1	841·0551	8246
26·0	832·4204	2·9203427	·2	841·3337	9684
·1	832·6989	4880	·3	841·6122	2·9251122
·2	832·9775	6333	·4	841·8908	2559
·3	833·2560	7785	29·5	842·1693	3995
·4	833·5346	9237	·6	842·4478	5431
26·5	833·8131	2·9210688	·7	842·7264	6866
·6	834·0916	2139	·8	843·0049	8301
·7	834·3702	3589	·9	843·2835	9736
·8	834·6487	5038			
·9	834·9273	6487	30·0	843·5620	2·9261171

Tension of Aqueous Vapour in Millimetres of Mercury, from − 9·9° to + 35° C.

°	mm.	°	mm.	°	mm.	°	mm.
−9·9	2·096	−7·3	2·603	−4·7	3·206	−2·1	3·925
·8	·114	·2	·624	·6	·231	−2·0	·955
·7	·132	·1	·645	·5	·257	−1·9	3·985
·6	·150	−7·0	·666	−4·4	·283	·8	4·016
·5	·168	−6·9	2·688	·3	·309	·7	·047
−9·4	·186	·8	·710	·2	·335	·6	·078
·3	·204	·7	·732	·1	·361	·5	·109
·2	·223	·6	·754	−4·0	·387	−1·4	·140
·1	·243	·5	·776	−3·9	3·414	·3	·171
−9·0	·261	−6·4	·798	·8	·441	·2	·203
−8·9	2·280	·3	·821	·7	·468	·1	·235
·8	·299	·2	·844	·6	·495	−1·0	·267
·7	·318	·1	·867	·5	·522	−0·9	4·299
·6	·337	−6·0	·890	−3·4	·550	·8	·331
·5	·356	−5·9	·914	·3	·578	·7	·364
−8·4	·376	·8	·938	·2	·606	·6	·397
·3	·396	·7	·962	·1	·634	·5	·430
·2	·416	·6	·986	−3·0	·664	−0·4	·463
·1	·436	·5	3·010	−2·9	3·691	·3	·497
−8·0	·456	−5·4	3·034	·8	·720	·2	·531
−7·9	2·477	·3	·058	·7	·749	·1	·565
·8	·498	·2	·082	·6	·778	−0·0	4·600
·7	·519	·1	·106	·5	·807	+0·0	4·600
·6	·540	−5·0	·131	−2·4	·836	·1	·633
·5	·561	−4·9	3·156	·3	·865	·2	·667
−7·4	·582	·8	·181	·2	·895	·3	·700

TENSION OF AQUEOUS VAPOUR—*continued.*

°	mm.	°	mm.	°	mm.	°	mm.
+·4	4·733	3·3	5·807	6·2	7·095	9·1	8·632
0·5	·767	·4	·848	·3	·144	·2	·690
·6	·801	3·5	·889	·4	·193	·3	·748
·7	·836	·6	·930	6·5	·242	·4	·807
·8	·871	·7	·972	·6	·292	9·5	·865
0·9	·905	·8	6·014	·7	·342	·6	·925
1·0	·940	3·9	·055	·8	·392	·7	·985
·1	·975	4·0	6·097	6·9	·442	·8	9·045
·2	5·011	·1	·140	7·0	7·492	9·9	·105
·3	·047	·2	·183	·1	·544	10·0	9·165
·4	·082	·3	·226	·2	·595	·1	·227
1·5	·118	·4	·270	·3	·647	·2	·288
·6	·155	4·5	·313	·4	·699	·3	·350
·7	·191	·6	·357	7·5	7·751	·4	·412
·8	·228	·7	·401	·6	·804	10·5	·474
1·9	·265	·8	·445	·7	·857	·6	·537
2·0	5·302	4·9	·490	·8	·910	·7	·601
·1	·340	5·0	6·534	·9	·964	·8	·665
·2	·378	·1	·580	8·0	8·017	10·9	·728
·3	·416	·2	·625	·1	·072	11·0	9·792
·4	·454	·3	·671	·2	·126	·1	·857
2·5	·491	·4	·717	·3	·181	·2	·923
·6	·530	5·5	·763	·4	·236	·3	·989
·7	·569	·6	·810	8·5	·291	·4	10·054
·8	·608	·7	·857	·6	·347	11·5	·120
2·9	·647	·8	·904	·7	·404	·6	·187
3·0	5·687	5·9	·951	·8	·461	·7	·255
·1	·727	6·0	6·998	8·9	·517	·8	·322
·2	·767	·1	7·047	9·0	8·574	11·9	·389

Tension of Aqueous Vapour—*continued.*

°	mm.	°	mm.	°	mm.	°	mm.
+12·0	10·457	14·9	12·619	17·8	15·167	20·7	18·159
·1	·526	15·0	12·699	·9	·262	·8	·271
·2	·596	·1	·781	18·0	15·357	20·9	·383
·3	·665	·2	·864	·1	·454	21·0	18·495
·4	·734	·3	·947	·2	·552	·1	·610
12·5	10·804	·4	13·029	·3	·650	·2	·724
·6	·875	15·5	·112	·4	·747	·3	·839
·7	·947	·6	·197	18·5	·845	·4	·954
·8	11·019	·7	·281	·6	·945	21·5	19·069
·9	·090	·8	·366	·7	16·045	·6	·187
13·0	11·162	15·9	·451	·8	·145	·7	·305
·1	·235	16·0	13·536	18·9	·246	·8	·423
·2	·309	·1	·623	19·0	16·346	21·9	·541
·3	·383	·2	·710	·1	·449	22·0	19·659
·4	·456	·3	·797	·2	·552	·1	·780
13·5	·530	·4	·885	·3	·655	·2	·901
·6	·605	16·5	·972	·4	·758	·3	20·022
·7	·681	·6	14·062	19·5	·861	·4	·143
·8	·757	·7	·151	·6	·967	22·5	·265
13·9	·832	·8	·241	·7	17·073	·6	·389
14·0	11·908	16·9	·331	·8	·179	·7	·514
·1	·986	17·0	14·421	19·9	·285	·8	·639
·2	12·064	·1	·513	20·0	17·391	22·9	·763
·3	·142	·2	·605	·1	·500	23·0	20·888
·4	·220	·3	·697	·2	·608	·1	21·016
14·5	12·298	·4	·790	·3	·717	·2	·144
·6	·378	17·5	·882	·4	·826	·3	·272
·7	·458	·6	·977	20·5	·935	·4	·400
·8	·538	·7	15·072	·6	18·047	23·5	·528

TENSION OF AQUEOUS VAPOUR—*continued.*

°	mm.	°	mm.	°	mm.	°	mm.
+23·6	21·659	26·5	25·738	29·4	30·479	32·3	35·962
·7	·790	·6	·891	29·5	·654	·4	36·165
·8	·921	·7	26·045	·6	·833	32·5	·370
23·9	22·053	·8	·198	·7	31·011	·6	·576
24·0	22·184	26·9	·351	·8	·190	·7	·783
·1	·319	27·0	26·505	29·9	·369	·8	·991
·2	·453	·1	·663	30·0	31·548	32·9	37·200
·3	·588	·2	·820	·1	·729	33·0	37·410
·4	·723	·3	·978	·2	·911	·1	·621
24·5	·858	·4	27·136	·3	32·094	·2	·832
·6	·996	27·5	·294	·4	·278	·3	38·045
·7	23·135	·6	·455	30·5	·463	·4	·258
·8	·273	·7	·617	·6	·650	33·5	·473
·9	·411	·8	·778	·7	·837	·6	·689
25·0	23·550	27·9	·939	·8	33·026	·7	·906
·1	·692	28·0	28·101	30·9	·215	·8	39·124
·2	·834	·1	·267	31·0	33·405	33·9	·344
·3	·976	·2	·433	·1	·596	34·0	39·565
·4	24·119	·3	·599	·2	·787	·1	·786
25·5	·261	·4	·765	·3	·980	·2	40·007
·6	·406	28·5	28·931	·4	34·174	·3	·230
·7	·552	·6	29·101	31·5	·368	·4	·455
·8	·697	·7	·271	·6	·564	34·5	·680
25·9	·842	·8	·441	·7	·761	·6	·907
26·0	24·988	28·9	·612	·8	·959	·7	41·135
·1	25·138	29·0	29·782	31·9	35·159	·8	·364
·2	·288	·1	·956	32·0	35·359	34·9	·595
·3	·438	·2	30·131	·1	·559	35·0	·827
·4	·588	·3	·305	·2	·760		

Logarithm of Numbers from 0 to 1000.

No.	0	1	2	3	4	5	6	7	8	9	Prop.
0	0	00000	30103	47712	60206	69897	77815	84510	90309	95424	
10	00000	00432	00860	01284	01703	02119	02530	02938	03342	03743	415
11	04139	04532	04922	05307	05690	06070	06446	06819	07188	07555	379
12	07918	08279	08637	08990	09342	09691	10037	10380	10721	11059	344
13	11394	11727	12057	12385	12710	13033	13354	13672	13988	14301	323
14	14613	14922	15229	15533	15836	16137	16435	16732	17026	17319	298
15	17609	17898	18184	18469	18752	19033	19312	19590	19866	20140	281
16	20412	20683	20952	21219	21484	21748	22011	22272	22531	22789	264
17	23045	23300	23553	23805	24055	24304	24551	24797	25042	25285	249
18	25527	25768	26007	26245	26482	26717	26951	27184	27416	27646	234
19	27875	28103	28330	28556	28780	29003	29226	29447	29667	29885	222
20	30103	30320	30535	30749	30963	31175	31386	31597	31806	32015	212
21	32222	32428	32633	32838	33041	33244	33445	33646	33846	34044	202
22	34242	34439	34635	34830	35025	35218	35411	35603	35793	35984	193
23	36173	36361	36549	36736	36922	37107	37291	37475	37658	37840	185
24	38021	38202	38382	38561	38739	38916	39094	39270	39445	39619	177
25	39794	39967	40140	40312	40483	40654	40824	40993	41162	41330	170
26	41497	41664	41830	41996	42160	42325	42488	42651	42813	42975	164
27	43136	43297	43457	43616	43775	43933	44091	44248	44404	44560	158
28	44716	44871	45025	45179	45332	45484	45637	45788	45939	46090	153
29	46240	46389	46538	46687	46835	46982	47129	47276	47422	47567	148
30	47712	47857	48001	48144	48287	48430	48572	48714	48855	48996	143
31	49136	49276	49415	49554	49693	49831	49969	50106	50243	50379	138
32	50515	50651	50786	50920	51055	51189	51322	51455	51587	51720	134
33	51851	51983	52114	52244	52375	52504	52634	52763	52892	53020	130
34	53148	53275	53403	53529	53656	53782	53908	54033	54158	54283	126
35	54407	54531	54654	54777	54900	55022	55145	55267	55388	55509	122
36	55630	55751	55871	55991	56110	56229	56348	56467	56585	56703	119
37	56820	56937	57054	57171	57287	57403	57519	57634	57749	57863	116
38	57978	58093	58206	58320	58433	58546	58659	58771	58883	58995	113
39	59106	59218	59328	59439	59550	59660	59770	59879	59989	60097	110
40	60206	60314	60423	60531	60638	60745	60853	60959	61066	61172	107

Indices of Logarithms:—

Log. 4030 = 3·60530
„ 403 = 2·60530
40·3 = 1·60530

Log. 4·03 = ·60530
„ ·403 = $\bar{1}$·60530
„ ·0403 = $\bar{2}$·60530
„ ·00403 = $\bar{3}$·60530

LOGARITHM OF NUMBERS FROM 0 TO 1000—*continued.*

No.	0	1	2	3	4	5	6	7	8	9	Prop.
41	61278	61384	61490	61595	61700	61805	61909	62014	62118	62221	104
42	62325	62428	62531	62634	62737	62839	62941	63043	63144	63246	102
43	63347	63448	63548	63649	63749	63849	63949	64048	64147	64246	99
44	64345	64444	64542	64640	64738	64836	64933	65031	65128	65225	98
45	65321	65418	65514	65609	65706	65801	65896	65992	66087	66181	96
46	66276	66370	66464	66558	66652	66745	66839	66932	67025	67117	95
47	67210	67302	67394	67486	67578	67669	67761	67852	67943	68034	92
48	68124	68215	68305	68395	68485	68574	68664	68753	68842	68931	90
49	69020	69108	69197	69285	69373	69461	69548	69636	69723	69810	88
50	69897	69984	70070	70157	70243	70329	70415	70501	70586	70672	86
51	70757	70842	70927	71012	71096	71181	71265	71349	71433	71517	84
52	71600	71684	71767	71850	71933	72016	72099	72181	72263	72346	82
53	72428	72509	72591	72673	72754	72835	72916	72997	73078	73159	81
54	73239	73320	73399	73480	73560	73639	73719	73799	73878	73957	80
55	74036	74115	74194	74273	74351	74429	74507	74586	74663	74741	78
56	74819	74896	74974	75051	75128	75205	75282	75358	75435	75511	77
57	75587	75664	75740	75815	75891	75967	76042	76118	76193	76268	75
58	76343	76418	76492	76567	76641	76716	76790	76864	76938	77012	74
59	77085	77159	77232	77305	77379	77452	77525	77597	77670	77743	73
60	77815	77887	77960	78032	78104	78176	78247	78319	78390	78462	72
61	78533	78604	78675	78746	78817	78888	78958	79029	79099	79169	71
62	79239	79309	79379	79449	79518	79588	79657	79727	79796	79865	70
63	79934	80003	80072	80140	80209	80277	80346	80414	80482	80550	69
64	80618	80686	80754	80821	80889	80956	81023	81090	81158	81224	68
65	81291	81358	81425	81491	81558	81624	81690	81757	81823	81889	67
66	81954	82020	82086	82151	82217	82282	82347	82413	82478	82543	66
67	82607	82672	82737	82802	82866	82930	82995	83059	83123	83187	64
68	83251	83315	83378	83442	83506	83569	83632	83696	83759	83822	63
69	83885	83948	84011	84073	84136	84198	84261	84323	84386	84448	63
70	84510	84572	84634	84696	84757	84819	84880	84942	85003	85065	62

Find Log. of 5065
Log. of 5060 .. = 3·70415
Prop. 86 × Diff. 5 .. = 430

Log. required = 3·704580

Find number of Log. .. 3·771442
Log. of .. .. 5900 = 3·770850

Diff. 592 ÷ Prop. 73 = 8. Diff. = 592

No. required 5908

LOGARITHM OF NUMBERS FROM 0 TO 1000—*continued.*

No.	0	1	2	3	4	5	6	7	8	9	Prop.
71	85126	85187	85248	85309	85370	85431	85491	85552	85612	85673	61
72	85733	85794	85854	85914	85974	86034	86094	86153	86213	86273	60
73	86332	86392	86451	86510	86570	86629	86688	86747	86806	86864	59
74	86923	86982	87040	87099	87157	87216	87274	87332	87390	87448	58
75	87506	87564	87622	87680	87737	87795	87852	87910	87967	88024	57
76	88081	88138	88196	88252	88309	88366	88423	88480	88536	88593	57
77	88649	88705	88762	88818	88874	88930	88986	89042	89098	89154	56
78	89209	89265	89321	89376	89432	89487	89542	89597	89653	89708	55
79	89763	89818	89873	89927	89982	90037	90091	90146	90200	90255	54
80	90309	90363	90417	90472	90526	90580	90634	90687	90741	90795	54
81	90848	90902	90956	91009	91062	91116	91169	91222	91275	91328	53
82	91381	91434	91487	91540	91593	91645	91698	91751	91803	91855	53
83	91908	91960	92012	92065	92117	92169	92221	92273	92324	92376	52
84	92428	92480	92531	92583	92634	92686	92737	92789	92840	92891	51
85	92942	92993	93044	93095	93146	93197	93247	93298	93349	93399	51
86	93450	93500	93551	93601	93651	93702	93752	93802	93852	93902	50
87	93952	94002	94052	94101	94151	94201	94250	94300	94349	94398	49
88	94448	94498	94547	94596	94645	94694	94743	94792	94841	94890	49
89	94939	94988	95036	95085	95134	95182	95231	95279	95328	95376	48
90	95424	95472	95521	95569	95617	95665	95713	95761	95809	95856	48
91	95904	95952	95999	96047	96095	96142	96190	96237	96284	96332	48
92	96379	96426	96473	96520	96567	96614	96661	96708	96755	96802	47
93	96848	96895	96942	96988	97035	97081	97128	97174	97220	97267	47
94	97313	97359	97405	97451	97497	97543	97589	97635	97681	97727	46
95	97772	97818	97864	97909	97955	98000	98046	98091	98137	98182	46
96	98227	98272	98318	98363	98408	98453	98498	98543	98588	98632	45
97	98677	98722	98767	98811	98856	98900	98945	98989	99034	99078	45
98	99123	99167	99211	99255	99300	99344	99388	99432	99476	99520	44
99	99564	99607	99651	99695	99739	99782	99826	99870	99913	99957	44

To multiply by logarithms, add the logarithms together and find the corresponding number.

To divide by logarithms, subtract one from the other.

To extract the root, divide the logarithm by the index of the root and find the number corresponding to it.

To raise a number to any power, multiply the logarithm by the index of the power and find the corresponding number.

Rules for Converting Parts per 100,000 into Grains per Gallon, or the reverse.

To convert parts per 100,000 into grains per gallon, multiply by 0·7.

To convert grains per gallon into parts per 100,000, divide by 0·7.

To convert grains per litre into grains per gallon, multiply by 70.

1 grain per gallon = ·01425 gram per litre.

Reduction of Cubic Centimetres of Nitrogen to Grams.

Log. $\frac{0\cdot0012562}{(1+\cdot00367\,t)\,760}$ for each tenth of a degree from 0° to 30° C.

tC.	0·0	0·1	0·2	0·3	0·4	0·5	0·6	0·7	0·8	0·9
°										
0	$\bar{6}\cdot21824$	808	793	777	761	745	729	713	697	681
1	665	649	633	617	601	586	570	554	538	522
2	507	491	475	459	443	427	412	396	380	364
3	349	333	318	302	286	270	255	239	223	208
4	192	177	161	145	130	114	098	083	067	051
5	035	020	004	*989	*973	*957	*942	*926	*911	*895
6	$\bar{6}\cdot20879$	864	848	833	817	801	786	770	755	739
7	723	708	692	676	661	645	629	614	598	583
8	567	552	536	521	505	490	427	459	443	428

REDUCTION OF CUBIC CENTIMETRES, &c.—*continued.*

tC.	0·0	0·1	0·2	0·3	0·4	0·5	0·6	0·7	0·8	0·9
°										
9	413	397	382	366	351	335	320	304	289	274
10	259	244	228	213	198	182	167	151	136	121
11	106	090	075	060	045	029	014	*999	*984	*969
12	$\bar{6}$·19953	938	923	907	892	877	862	846	831	816
13	800	785	770	755	740	724	709	694	679	664
14	648	633	618	603	588	573	558	543	528	513
15	497	482	467	452	437	422	407	392	377	362
16	346	331	316	301	286	271	256	241	226	211
17	196	181	166	157	136	121	106	091	076	061
18	046	031	016	001	*986	*971	*956	*941	*926	*911
19	$\bar{6}$·18897	882	867	852	837	822	807	792	777	762
20	748	733	718	703	688	673	659	644	629	614
21	600	585	570	555	540	526	511	496	481	466
22	452	437	422	408	393	378	363	349	334	319
23	305	290	275	261	246	231	216	202	187	172
24	158	143	128	114	099	084	070	055	041	026
25	012	*997	*982	*968	*953	*938	*924	*909	*895	*880
26	$\bar{6}$·17866	851	837	822	808	793	779	764	750	735
27	721	706	692	677	663	648	631	619	605	590
28	576	561	547	532	518	503	489	475	460	446
29	432	417	403	388	374	360	345	331	316	302

Clark's Table of Hardness of Water.

Degrees of Hardness (Pure Water).	Measures of Soap Solution.	Differences for the next 1° of Hardness.
0°	1·4	1·8
1	3·2	2·2
2	5·4	2·2
3	7·6	2·0
4	9·6	2·0
5	11·6	2·0
6	13·6	2·0
7	15·6	1·9
8	17·5	1·9
9	19·4	1·9
10	21·3	1·8
11	23·1	1·8
12	24·9	1·8
13	26·7	1·8
14	28·5	1·8
15	30·3	1·7
16	32·0	..

Each measure equals 10 grains, the quantity of water operated upon equals 1000 grains, and each "degree of hardness" indicates 1 grain of calcium carbonate per gallon.

TABLE OF HARDNESS, PARTS IN 100,000.
(50 c. c. of water operated upon.)

Volume of Soap Solution.	$CaCO_3$ per 100,000.	Volume of Soap Solution.	$CaCO_3$ per 100,000.	Volume of Soap Solution.	$CaCO_3$ per 100,000.
c. c.		c. c.		c. c.	
0·7	·00	4·2	4·86	7·7	9·86
0·8	·16	·3	5·00	·8	10·00
0·9	·32	·4	·14	·9	·15
1·0	·48	·5	·29	8·0	·30
·1	·63	·6	·43	·1	·45
·2	·79	·7	·57	·2	·60
·3	·95	·8	·71	·3	·75
·4	1·11	·9	·86	·4	·90
·5	·27	5·0	6·00	·5	11·05
·6	·43	·1	·14	·6	·20
·7	·56	·2	·29	·7	·35
·8	·69	·3	·43	·8	·50
·9	·82	·4	·57	·9	·65
2·0	·95	·5	·71	9·0	·80
·1	2·08	·6	·86	·1	·95
·2	·21	·7	7·00	·2	12·11
·3	·34	·8	·14	·3	·26
·4	·47	·9	·29	·4	·41
·5	·60	6·0	·43	·5	·56
·6	·73	·1	·57	·6	·71
·7	·86	·2	·71	·7	·86
·8	·99	·3	·86	·8	13·01
·9	3·12	·4	8·00	·9	·16
3·0	·25	·5	·14	10·0	·31
·1	·38	·6	·29	·1	·46
·2	·51	·7	·43	·2	·61
·3	·64	·8	·57	·3	·76
·4	·77	·9	·71	·4	·91
·5	·90	7·0	·86	·5	14·06
·6	4·03	·1	9·00	·6	·21
·7	·16	·2	·14	·7	·37
·8	·29	·3	·29	·8	·52
·9	·43	·4	·43	·9	·68
4·0	·57	·5	·57	11·0	·84
·1	·71	·6	·71	·1	15·00

TABLE OF HARDNESS—*continued.*

Volume of Soap Solution.	$CaCO_3$ per 100,000.	Volume of Soap Solution.	$CaCO_3$ per 100,000.	Volume of Soap Solution.	$CaCO_3$ per 100,000.
c. c.		c. c.		c. c.	
11·2	15·16	12·9	17·86	14·5	20·40
·3	·32	13·0	18·02	·6	·56
·4	·48	·1	·17	·7	·71
·5	·63	·2	·33	·8	·87
·6	·79	·3	·49	·9	21·03
·7	·95	·4	·65	15·0	·19
·8	16·11	·5	·81	·1	·35
·9	·27	·6	·97	·2	·51
12·0	·43	·7	19·13	·3	·68
·1	·59	·8	·29	·4	·85
·2	·75	·9	·44	·5	22·02
·3	·90	14·0	·60	·6	·18
·4	17·06	·1	·76	·7	·35
·5	·22	·2	·92	·8	·52
·6	·38	·3	20·08	·9	·69
·7	·54	·4	·24	16·0	·86
·8	·70				

TABLE SHOWING THE QUANTITIES OF THE FOLLOWING BODIES REQUIRED TO PRODUCE ONE DEGREE OF HARDNESS (DEGRÉ HYDROTIMÉTRIQUE) WHEN DISSOLVED IN A LITRE OF WATER.

Form.	Grams.	Form.	Grams.
CaO	·0057	$MgSO_4$	·0125
$CaCl_2$	·0114	$NaCl$	·0120
$CaCO_3$	·0103	Na_2SO_4	·0146
$CaSO_4$	·0140	SO_3	·0082
MgO	·0042	Cl	·0073
$MgCl_2$	·0090	CO_2 (gas)	5 c. c.
Mg_2CO_3	·0088		

TABLE I.—FOR DEW POINT.

To obtain the dew point, multiply the difference of reading of the thermometers by the factor opposite the dry-bulb reading and subtract the product from the dry-bulb reading.

Dry-bulb Ther. F.	Factor.	Dry-bulb Ther. F.	Factor.	Dry-bulb Ther. F.	Factor.	Dry-bulb Ther. F.	Factor.
10	8·78	33	3·01	56	1·94	78	1·69
11	8·78	34	2·77	57	1·92	79	1·69
12	8·78	35	2·60	58	1·90	80	1·68
13	8·77	36	2·50	59	1·89	81	1·68
14	8·76	37	2·42	60	1·88	82	1·67
15	8·75	38	2·36	61	1·87	83	1·67
16	8·70	39	2·32	62	1·86	84	1·66
17	8·62	40	2·29	63	1·85	85	1·65
18	8·50	41	2·26	64	1·83	86	1·65
19	8·34	42	2·23	65	1·82	87	1·64
20	8·14	43	2·20	66	1·81	88	1·64
21	7·88	44	2·18	67	1·80	89	1·63
22	7·60	45	2·16	68	1·79	90	1·63
23	7·28	46	2·14	69	1·78	91	1·62
24	6·92	47	2·12	70	1·77	92	1·62
25	6·53	48	2·10	71	1·76	93	1·61
26	6·08	49	2·08	72	1·75	94	1·60
27	5·61	50	2·06	73	1·74	95	1·60
28	5·12	51	2·04	74	1·73	96	1·59
29	4·63	52	2·02	75	1·72	97	1·59
30	4·15	53	2·00	76	1·71	98	1·58
31	3·70	54	1·98	77	1·70	99	1·58
32	3·32	55	1·96				

TABLE II., SHOWING THE MAXIMUM ELASTIC FORCE OF AQUEOUS VAPOUR IN INCHES OF MERCURY FOR EVERY DEGREE FAHR., FROM 0° TO 100°.

Temp. Fahr.	Force of Vapour. Inch. of Mercury.	Diff.	Temp. Fahr.	Force of Vapour. Inch. of Mercury.	Diff.	Temp. Fahr.	Force of Vapour. Inch. of Mercury.	Diff.
0	·044	2	34	·196	8	68	·684	24
1	·046	2	35	·204	8	69	·708	25
2	·048	2	36	·212	8	70	·733	26
3	·050	2	37	·220	9	71	·759	26
4	·052	2	38	·229	9	72	·785	27
5	·054	3	39	·238	9	73	·812	28
6	·057	3	40	·247	10	74	·840	28
7	·060	2	41	·257	10	75	·868	29
8	·062	3	42	·267	10	76	·897	30
9	·065	3	43	·277	11	77	·927	31
10	·068	3	44	·288	11	78	·958	32
11	·071	3	45	·299	12	79	·990	33
12	·074	4	46	·311	12	80	1·023	34
13	·078	4	47	·323	12	81	1·057	35
14	·082	4	48	·335	13	82	1·092	36
15	·086	4	49	·348	13	83	1·128	37
16	·090	4	50	·361	13	84	1·165	38
17	·094	4	51	·374	14	85	1·203	39
18	·093	5	52	·388	15	86	1·242	40
19	·103	5	53	·403	15	87	1·282	41
20	·108	5	54	·418	15	88	1·323	43
21	·113	5	55	·433	16	89	1·366	44
22	·118	5	56	·449	16	90	1·410	45
23	·123	6	57	·465	17	91	1·455	46
24	·129	6	58	·482	18	92	1 501	47
25	·135	6	59	·500	18	93	1·548	48
26	·141	6	60	·518	19	94	1·596	50
27	·147	6	61	·537	19	95	1·646	51
28	·153	7	62	·556	20	96	1·697	54
29	·160	7	63	·576	20	97	1·751	55
30	·167	7	64	·596	21	98	1·806	56
31	·174	7	65	·617	22	99	1·862	56
32	·181	7	66	·639	22	100	1·918	
33	·188	8	67	·661	23			

TABLE III.—FOR DEW POINT.

Temperature, Fahr.	Weight of a Cubic Foot of Saturated Vapour.	Weight of a Cubic Foot of Dry Air.	Weight of a Cubic Foot of Air saturated with Vapour.	Temperature, Fahr.	Weight of a Cubic Foot of Saturated Vapour.	Weight of a Cubic Foot of Dry Air.	Weight of a Cubic Foot of Air saturated with Vapour.
	Grains.	Grains.	Grains.		Grains.	Grains	Grains.
0	0·55	606·37	606·03	56	5·04	540·45	537·45
5	0·68	599·83	599·40	57	5·21	539·40	536·30
10	0·84	593·44	592·94	58	5·39	538·36	535·15
15	1·04	587·18	586·55	59	5·58	537·32	534·00
20	1·30	581·05	580·26	60	5·77	536·28	532·84
25	1·61	575·05	574·08	61	5·97	535·25	531·69
30	1·97	569·17	567·99	62	6·17	534·22	530·55
32	2·13	566·85	565·58	63	6·38	533 20	529·42
35	2·39	563·42	561·99	64	6·59	532·18	528·28
40	2·86	557·77	556·03	65	6·81	531·17	527·14
41	2·97	556·66	554·86	66	7·04	530·16	526·01
42	3·08	555·55	553·69	67	7·27	529·15	524·86
43	3·20	554·44	552·52	68	7 51	528·14	523·71
44	3·32	553·34	551·35	69	7·76	527·14	522·56
45	3·44	552·24	550·19	70	8·01	526·15	521·41
46	3·56	551·15	549·02	71	8·27	525·16	520·27
47	3·69	550·06	547·85	72	8·54	524·17	519·12
48	3·82	548·97	546·69	73	8·82	523·18	517·98
49	3·96	547·89	545·53	74	9·10	522·20	516·83
50	4·10	546·81	544·37	75	9·39	521·22	515·69
51	4·24	545·74	543·21	80	10·98	516·39	509·97
52	4·39	544·67	542·06	85	12·73	511·65	504·19
53	4·55	543·61	540·89	90	14·85	506·99	498·43
54	4·71	542·55	539·75	95	17·18	502·41	492·56
55	4·87	541·50	538·60	100	19·84	497·93	486·65

Behaviour of Metals with Air.

Metal.	Colour.	Behaviour at Ordinary Temperatures.	Behaviour at High Temperatures.
Aluminium ..	White	It remains bright	Heated to redness it burns with a white light to Al_2O_3.
Antimony ..	"	" "	It oxidizes at the melting point, forming Sb_2O_3.
Arsenic ..	Grey-white	It gradually tarnishes	It oxidizes to As_2O_3.
Bismuth ..	Reddish-white.	It is unaltered in dry air, tarnished by moist air.	It burns to Bi_2O_3 when strongly heated.
Cadmium ..	White	It remains bright in air free from CO_2.	It burns to CdO.
Cæsium ..	—	It behaves like K.	
Calcium ..	Light-yellow.	It remains bright for some time in dry air, oxidizes in moist.	It burns to CaO.
Cerium	Grey-white	It becomes covered with a blue tarnish.	It burns to Ce_3O_4, if further heated it sparkles.
Chromium ..	Steel-grey	It remains bright	It oxidizes on the surface to Cr_2O_3.
Cobalt	Grey-white	It is unacted on by dry air, slowly oxidized by moist.	Strongly heated it burns with a red light, forming Co_6O_7.
Copper	Red	It is unacted upon by dry air, in the presence of water vapour and CO_2 it tarnishes.	It burns at high temperatures with a green light, forming CuO.

BEHAVIOUR OF METALS WITH AIR—*continued.*

Metal.	Colour.	Behaviour at Ordinary Temperatures.	Behaviour at High Temperatures.
Gold	Yellow	It does not oxidize	It does not oxidize.
Indium	Tin-white	It remains bright	It melts, and colours the flame blue.
Iridium	White	It does not oxidize	If it has been reduced by hydrogen at a low temperature it oxidizes slowly.
Iron	"	It remains bright in dry air, but rusts in moist air.	It forms Fe_3O_4.
Lead	"	It tarnishes	It forms PbO (Pb_3O_4 if continued).
Lithium	Silver-white	It tarnishes, becoming slightly yellow.	Heated above 180° C. it burns to Li_2O, said to be mixed with peroxide.
Manganese	White	It forms Mn_3O_4	It oxidizes to Mn_3O_4.
Mercury	"	Unacted on	It forms HgO.
Molybdenum	"	It does not tarnish	It forms MoO_3.
Nickel	"	It is unoxidized	It forms NiO.
Osmium	Bluish-white.	" "	It forms OsO_4, which volatilizes.
Palladium	White	It is unacted on	At low red heat it forms PdO, which is reduced on further ignition.
Platinum	"	" "	It is unacted on.

BEHAVIOUR OF METALS WITH AIR—*continued.*

Metal.	Colour.	Behaviour at Ordinary Temperatures.	Behaviour at High Temperatures.
Potassium ..	White	It instantly tarnishes	It forms K_2O_4 mixed with K_2O.
Rhodium ..	"	It is not oxidized	It oxidizes.
Rubidium ..	Yellowish-white.	It instantly oxidizes	It burns to oxide.
Silver	White	It is unacted upon, it is blackened if SH_2 be present.	It is not oxidized.
Sodium	"	It oxidizes	It burns, forming a mixture of Na_2O and Na_2O_2.
Strontium ..	Gold-yellow	It tarnishes in moist air, but not in dry air.	It forms SrO.
Thallium ..	Tin-white	It rapidly tarnishes, forming Tl_2O and a little Tl_2O_3.	It forms Tl_2O_3 mixed with a little Tl_2O.
Tin	White	It is unacted on	It forms SnO_2 mixed with SnO.
Titanium ..	Grey-powder.	It is not oxidized	It forms TiO_2.
Tungsten ..	Steel-grey	It is unoxidized	It forms WO_3 if pulverulent.
Uranium ..	White	It tarnishes	It forms U_3O_4 if pulverulent.
Vanadium ..	"	It is unoxidized	It forms V_2O_5 (probably).
Zinc	Bluish-white.	It slightly tarnishes..	It forms ZnO.
Zirconium (amorphous)	Greyish-white.	It tarnishes	It forms ZrO_2.

Behaviour of the Metals with Acids.

With Sulphuric Acid.

Not attacked (by strong or dilute)	Gold, iridium, osmium, platinum, rhodium, ruthenium.

With Dilute Sulphuric Acid.

Not attacked at ordinary temperatures.	Antimony, arsenic, lead, chromium, copper, molybdenum, mercury, silver, titanium, uranium, bismuth, tin, zirconium; palladium is slightly attacked.

Soluble with evolution of hydrogen at ordinary temperatures—

Easily Soluble.	Slowly Soluble.
Glucinum.	Aluminium.
Cerium.	Indium.
Iron.	Cobalt.
Magnesium.	Nickel.
Manganese.	Chromium } Soluble on heating.
Thallium.	Tin } Soluble on heating.
Zinc.	
Cadmium.	
Calcium } Superficially attacked.	
Strontium } Superficially attacked.	
Barium } Superficially attacked.	
Cæsium.	
Rubidium.	
Potassium.	
Sodium.	
Lithium.	

With Strong Sulphuric Acid.

Insoluble in cold concentrated acid	Antimony, arsenic, lead, chromium, gold, iridium, copper, osmium, mercury, palladium, platinum, rhodium, ruthenium, silver, titanium, bismuth, zirconium.
Slowly soluble in cold concentrated acid (easily soluble on heating).	Cadmium, iron, cobalt, manganese, nickel, zinc.
Easily soluble in cold concentrated acid.	Glucinum, molybdenum, indium.
Soluble in hot concentrated acid, with evolution of SO_2.	Antimony, arsenic, lead, copper, palladium (diff.), mercury, silver, bismuth, zirconium.

With Nitric Acid.

Not attacked by hot or cold acid.	Chromium, gold, iridium, osmium, platinum, rhodium, ruthenium.

With Dilute Nitric Acid.

Insoluble.	Aluminium, arsenic, palladium, titanium, zirconium.

Slightly soluble—Glucinum, indium.

Easily soluble.	Lead, cadmium, calcium, iron, cobalt, copper, magnesium, manganese, nickel, mercury, silver, strontium, thallium, uranium, bismuth, zinc, the alkali metals; antimony and tin are oxidized, but not dissolved.

With Strong Acid.

Not attacked—

Aluminium, Arsenic, Palladium, Titanium — in the cold.	Iridium.
Iron (in the passive state).	Platinum.
Calcium.	Rhodium.
Chromium.	Ruthenium.
Gold.	Strontium.
	Zirconium.

Soluble in strong acid, but not soluble (or only slightly soluble) in dilute acid.	Aluminium (on digesting), arsenic (on heating), glucinum, indium, osmium (only as powder), palladium (on heating), titanium.

With Hydrochloric Acid.

Not attacked.	Antimony, gold, iridium, copper (air being excluded), molybdenum, osmium, mercury, platinum, rhodium, ruthenium, vanadium.

Slightly attacked.	Arsenic, lead, palladium, silver (on the surface), bismuth and zirconium (slowly on digesting).
Soluble.	Aluminium, cadmium, calcium, cerium, chromium, cobalt, glucinum, iron, indium, magnesium, manganese, nickel, strontium, thallium, titanium, tin, zinc, alkali metals.

BEHAVIOUR OF METALS WITH SODA AND POTASH.

Insoluble.	Antimony, iron, indium, gold, copper, molybdenum, mercury, nickel, silver, bismuth, vanadium. The following are attacked by fused alkali, but not by solutions: Platinum, osmium, iridium, ruthenium, rhodium, palladium.
Soluble.	Aluminium, glucinum, zinc, tin (on warming).

Table showing the Behaviour of the Metals (Common and Rare) with a Borax Bead.

Contractions: l. q. means large quantity, and s q. small quantity.

Colour of Bead.	In Oxidizing Flame when		In Reducing Flame when	
	Hot.	Cold.	Hot.	Cold.
Colourless	Si, Al, Sn, Ba, Sr, Ca, Mg, Gl, Y, Zr, Tb, La, Te, Ta, Nb, W, Mo, Ti. Zn, Cd, Pb, Bi, Sb, in s. q., if not yellow.	Si, Al, Sn, Ba, Sr, Ca, Mg, Gl, Y, Zr, Th, La, Te, Ta, Nb, Ti, W, Mo, Zn, Cd. Pb, Bi, Sb, Ag. Fe in s. q.	Si, Al, Sn, Ba, Sr, Ca, Mg, Gl, Y, Zr, Th, La, Di, Mn. Nb in s. q. Ag, Zn, Cd, Pb, Ni, Bi, Sb, Te, on long heat.; if not grey and opaque.	Si, Al, Sn, Di, Mn; Ba, Sr, Ca, Mg, Gl, Y, Zr, Th, La, Ce, Ta. Nb in s. q. Ag, Zn, Cd, Pb. Br, Sb, Ni, Te, on long heat.; if not grey and opaque. Fe in s. q.
Grey and opaque.	—	—	Ag, Zn, Cd, Pb, Sb, Ni, Fe, on short heat.; if not colourless. Nb in l. q.	Ag, Zn, Cd, Pb, Bi, Sb, Ni, Fe, on short heat.; if not colourless. Nb in l. q.
Pale yellow.	Ag, Cd, Zn, in l. q.	Ag	—	—
Yellow.	Ti, W, Pb, Sb, Mo, in l. q. U in s. q.	Va, Fe; Ce; U.	Ti in s. q., if not violet-blue Mo in s. q.; if in l. q., brown. W, Va.	Mo, in l. q opaque and brown. W, in l. q brown.
Reddish yellow.	Cr. Fe, in s. q. Bi in l. q.	—	U	—
Red.	Ce	—	—	—
Dark red.	Fe in l. q.	Mn (violaceous).	—	—
Brownish red.	Cr, U	Ni	Cu	Cu
Violet.	Mn, Ni, Di	Di	—	Ti
Blue.	Co	Co; Cu (greenish while cooling.	Co	Co; Cu nearly colourless on long heat.
Green.	Cu	Cr (yellowish while cooling).	Fe. Cr (brownish), Cu, nearly colourless on long heat.	Fe, U, Cr, Va

TABLE SHOWING THE BEHAVIOUR OF THE METALS (COMMON AND RARE) WITH A BEAD OF MICROCOSMIC SALT.

Contractions: l. q. means large quantity, and s. q. small quantity.

Colour of Bead.	In Oxidizing Flame when		In Reducing Flame when	
	Hot.	Cold.	Hot.	Cold.
Colourless, with a floating "skeleton."	Si	Si	Si	Si
Colourless	Al, Sn, Ba, Sr, Ca, Mg, Gl, Y, Zr, Th, La, Nb, Te, in all proportions. Ta, Ti, W, Zn, Cd, Pb, Bi, Sb, in s. q., if not yellow.	Al, Sn; Ba, Sr, Ca, Mg, Gl, Y, Zr, Th, La, Te. Ce, Nb, Ta, Ti, W, Zn, Cd, Pb, Bi, Sb. Fe in s. q.	Al, Sn, Ba, Sr, Ca, Mg, Gl, Y, Zr, Th, La, Ce, Di, Mn; Ta, Ag, Zn, Cd, Pb, Bi, Sb, Ni, Te, on strong ignition; if not grey and opaque.	Al, Sn; Ba, Sr, Ca, Mg, Gl, Y, Zr, Th, La; Ce, Di, Mn, Ta; Ag, Zn, Cd, Pb, Bi, Sb, Ni, Te, on strong ignition; if not grey and opaque. Fe in s. q.
Grey and opaque.	—	—	Ag, Zn, Cd, Pb, Bi, Sb, Te, Ni.	Ag, Zn, Cd, Pb, Bi, Sb, Te, Ni.
Pale yellow.	Sb, Zn in l. q.	Ag, Fe	—	Fe
Yellow.	Pb in very l. q. Bi, Cd, Ta, Ti, W, in l. q. Ag, Ce, Ni, U, Va; Cr, Fe, in s. q.	Fe in l. q. Ni in s. q. U (greenish). Va	Ti	Fe (greenish) in l. q.
Reddish yellow.	Cr, Fe, in l. q.	Ni in l. q.	Fe in s. q.; Va	Fe while cooling.
Red.	—	—	Fe (brown)	—
Dark red.	—	—	—	Cu, opaque
Brownish red.	Ni; Fe, Cr, in very l. q.	—	Cr, Fe	Cu, opaque
Violet.	Mn, Di	Mn, Di	Nb in l. q.	Nb, Ti
Blue.	Co	Co, Cu, greenish while cooling.	Co, W; Nb in very l. q.	Co, W; Nb in very l. q.
Green.	Cu; Mo (yellowish).	Mo, U (greenish). Cr (emerald.	U, Mo, Cu	Cr, U, Mo, Va

EXAMINATION OF SOLIDS IN THE DRY WAY.

Experiment.	Observation.	Presence of
Heat in a piece of hard glass tube, closed at one end.	The substance—	
	blackens	Organic matter.
	becomes—	
	yellow when hot	Zn.
	white when cold	
	yellowish brown when hot	Pb.
	yellow when cold	
	white to yellowish brown when hot	Sn.
	dirty light yellow when cold	
	white to orange when hot	Bi.
	pale yellow when cold	
	brownish red to black when hot	Fe.
	brownish red when cold	
	yellow to dark orange when hot	K_2CrO_4.
	gives off water, which, if alkaline, indicates Am., if acid, indicates volatile acids.	Water of crystallization, of hydration; or moisture.
	gives off gas or fumes—	
	O_2, test by splint	Peroxides, chlorates, nitrates.
	SO_2, test by odour	Sulphates, &c.
	N_2O_4, test by colour and odour	Nitrates of heavy metals.
	CO_2, test by drop of lime water on watch-glass	Carbonates, oxalates.
	CO_2 and CO, test by blue flame	Oxalates.
	CO, with marked charring	Formates.
	Cl_2, Br_2, I_2, test by colour and odour	Chlorides, bromides, or iodides.
	$(CN)_2$, test by odour and crimson flame ..	Cyanides.
	SH_2, test by odour and formation of PbS ..	Sulphides containing water.

EXAMINATION OF SOLIDS IN THE DRY WAY—*continued*.

Experiment.	Observation.	Presence of
Heat in a piece of hard glass tube, closed at one end.	The substance—	
	gives off gas or fumes—	
	NH_3, test by odour and turmeric paper	Ammonium salts, also cyanides and other nitrogenized matters.
	S_2	Persulphides.
	forms a sublimate of—	
	S_2 { reddish brown drops when hot .. .. / solid and yellow when cold	Persulphides.
	I_2 violet vapour, black sublimate	I_2.
	White matter	Ammonium salts, $HgCl_2$ (yellow-hot), Hg_2Cl_2, As_2O_3 (crystals), oxalic acid.
	As_4 black mirror	As_4.
	Hg mirror and globules	Hg.
	HgS black (turns red if rubbed)	Hg.
	Sb_2O_3 yellow liquid before subliming, then a sublimate of crystalline needles.	Sb.
Heat by the reducing flame in a cavity on charcoal.	fuses and is absorbed by the charcoal	Alkaline salts.
	leaves an infusible white residue (if alkaline, Ba, Sr, Ca, Mg).	Ba, Sr, Ca, Mg, Al, Zn, SiO_2.
	which, moistened with cobalt nitrate, and again heated, becomes .. .. { blue ..	Al, SiO_2, alkaline earthy phosphates.
	green .	Zn.
	pink .	Mg.
	deflagrates	Nitrates, chlorates.

EXAMINATION OF SOLIDS IN THE DRY WAY—*continued.*

Experiment.	Observation.	Presence of
Heat by the reducing flame in a cavity on charcoal.	The substance—	
	forms an incrustation—	
	white, distant from flame, garlic odour.. ..	As_4.
	white nearer to flame	Sb_4.
	yellow when hot, white when cold	Zn.
	faint yellow when hot, white when cold, close to flame.	Sn.
	yellow	Pb.
	dark orange yellow while hot	Bi_4.
	lemon yellow when cold	
	brownish red or yellow	Cd.
	dark red (slight)	Ag.
— mixed with KCy and Na_2CO_3.	forms metallic beads or scales without incrustation.	Ag, Au, Cu (beads), Fe, Co, Ni (magnetic scales).
	forms metallic scales, with incrustation, as above—	
	malleable bead	Sn, Pb.
	brittle bead	Bi_4, Sb_4.
Heat a fragment in a bead of microcosmic salt, or of borax. (See Table for beads.)	forms a coloured bead when hot—	
	blue	Co.
	green; on cooling, blue; in reducing flame, red	Cu.
	green, unaltered in reducing flame..	Cr.
	reddish; yellow or colourless on cooling ..	Ni.
	amethyst red, colourless in reducing flame ..	Mn.
	brownish red; light yellow, on cooling; in reducing flame: yellow, hot; green, cold.	Fe.

EXAMINATION OF SOLIDS IN THE DRY WAY—*continued.*

Experiment.	Observation.	Presence of
Heat on a platinum wire with HCl.	The substance—colours the outer flame—	
	yellow	Na_2.
	violet	K_2 (observe through cobalt glass).
	crimson	Sr.
	brick red	Ca.
	green	Cu, B.
	blue	As_4, Sb_4, Pb, Cu.

EXAMINATION OF THE NEUTRAL OR ACID SOLUTION IN THE WET WAY.

If the solution is alkaline, the addition of hydrochloric acid may produce a precipitate consisting of, a salt of lead or silver insoluble in hydrochloric acid, SiH_4O_4, As_2S_3, Sb_2S_3, SnS_2, S_2, Au_2S_3, PtS_2, HgS, CuS, NiS, &c., this must be examined separately.

A.

Add moderate excess of HCl, filter. Wash the precipitate twice with cold water, and add the washings to the filtrate. Examine the filtrate by B. Treat the precipitate on the filter with hot water.

<table>
<tr><td colspan="2">Residue—treat on the filter with warm dilute AmHO, after well washing with hot water in presence of lead.</td><td rowspan="2">The filtrate from the washing with hot water may contain $PbCl_2$. Test for Pb by SH_2, H_2SO_4 and alcohol, or by K_2CrO_4.</td></tr>
<tr><td>Residue is black, indicating Hg. Confirm.</td><td>Filtrate, reacidulate with HNO_3. A white, curdy precipitate indicates Ag.</td></tr>
</table>

B.—*Examination of the Filtrate from A.*

(A small quantity or this filtrate should be treated with SH_2, if no precipitate forms, proceed to examine the bulk of the solution by C.) Dilute the filtrate from A if very acid, and pass excess of SH_2, filter and wash. Examine the filtrate by C. The residue is gently heated in a test tube with water and a little yellow ammonium sulphide (in presence of Cu and absence of Hg use sodium hydrate), filter, treat the residue once more with a little ammonium sulphide, and mix the two filtrates.

<table>
<tr>
<td colspan="4">Residue—wash, then boil with dilute HNO_3 (neglect sulphur clot which forms), and filter off a few drops, to which add H_2SO_4 and alcohol. If lead is present, a white precipitate forms. In the absence of lead, filter the whole of the liquid, and examine for Bi, Cu, and Cd by addition of AmHO, as below. In presence of lead add H_2SO_4 and alcohol, and filter.</td>
<td colspan="2">Filtrate—acidulate with HCl, filter, and wash the precipitate, which then digest with $(NH_4)HCO_3$; filter. (If the precipitate caused by HCl is brown or black, Au and Pt (and Sn″) may be present.)</td>
</tr>
<tr>
<td colspan="2">Residue—boil in $(NH_4)H_3C_2O_2$, and filter when cool.</td>
<td colspan="2">Filtrate—boil off the alcohol, if any is present, and add excess of AmHO; boil and filter.</td>
<td rowspan="2">Residue—dissolve in boiling HCl. Introduce into a small flask containing a strip of pure zinc and fitted with a delivery tube, SbH_3 is evolved if Sb is present. The mirror formed on porcelain is insoluble in cold sodic hypochlorite. The residue on the zinc must be detached by scraping, and boiled with HCl and a piece of platinum foil. The solution, diluted with water and mixed with $HgCl_2$, gives a precipitate of Hg_2Cl_2, at first white, but changing afterwards to grey Hg. This indicates presence of Sn.</td>
<td rowspan="2">Solution—acidulate with HCl, a yellow precipitate indicates As. Confirm.</td>
</tr>
<tr>
<td>Residue — dissolve in HCl by the aid of $KClO_3$, and test for Hg by a strip of copper. Or dry and heat in a bulb tube with Na_2CO_3 when metallic beads indicate Hg.</td>
<td>Filtrate—add K_2CrO_4, a yellow precipitate indicates Pb.</td>
<td>Precip.—dissolve in dilute HCl, evaporate nearly to dryness, and add much water; a milkiness indicates Bi.</td>
<td>Filtrate* — if blue, Cu is present; add KCy till the blue disappears, and then pass SH_2, a yellow precip. ind. Cd. In the absence of blue colour pass SH_2 at once.</td>
</tr>
</table>

* Place a large drop of the ammoniacal liquid, if blue, on Swedish filter paper, and, after the drop has spread, expose to SH_2. A bright yellow ring fringing the black patch is formed, if Cd be present in sufficient quantity.

C.—*Examination of the Filtrate from* B.

Evaporate till free from SH_2, add a little nitric acid and take down to dryness; ignite to redness if organic matter (or oxalates) be suspected. Treat with a little strong HCl, and then add water. SiO_2 is left insoluble if present. Test* this solution for phosphoric acid with ammonic molybdate. In the absence of phosphoric acid examine by *Ca*, if phosphoric acid is present, by *Cb*.

Ca.

Add AmHO in excess, warm and filter. (If Mn is present, part of it often precipitates with the iron, and is best tested for by fusing some of the $Fe_2H_6O_6$ with Na_2CO_3 and KNO_3.)

<table>
<tr><td colspan="3">The precipitate, after being washed, is dissolved in HCl, and excess of pure NaHO added. The liquid is boiled and filtered.</td><td colspan="4">Filtrate — add SAm_2, filter and examine filtrate by D. Precipitate—wash, dissolve in HCl, add excess of NaHO, boil and filter.</td></tr>
<tr><td colspan="2">Residue—dissolve in HCl and boil with NaHO and NaClO in excess. Filter.</td><td rowspan="4">Filtrate—add excess of dilute HCl, and then add slight excess of AmHO and boil; a white gelatinous precipitate indicates Al.</td><td colspan="3">Precipitate—wash, dissolve in HCl, add slight excess of AmHO and then excess of $H_4C_2O_2$. Pass SH_2.</td><td></td></tr>
<tr><td>Residue—dissolve in HCl and add K_4FeCy_6. A blue precipitate indicates Fe.</td><td>Filtrate is yellow, add acetic acid and lead acetate. A yellow precipitate indicates Cr.</td><td colspan="2">Precipitate—dissolve in HCl and $KClO_3$, nearly neutralize with $NaCO_3$, add KCy till the precipitate at first formed redissolves (filter here if not clear). Boil till HCy disappears, cool, add NaClO, warm, and allow to stand until a black precipitate forms.</td><td rowspan="3">Solution—add AmHO, AmCl, and SAm_2. A flesh-coloured precipitate indicates Mn.</td><td rowspan="3">Filtrate—add SH_2. A white precipitate indicates Zn.</td></tr>
<tr><td colspan="2">Or, Residue—fuse with Na_2CO_3 and KNO_3, treat with hot water, and filter.</td><td>Precipitate is black. Presence of Ni.</td><td>Solution—evaporate a few drops to dryness, and heat the residue in a borax bead. Blue bead indicates Co.</td></tr>
<tr><td>Residue—treat as above for Fe.</td><td>Filtrate is yellow, treat as above for Cr.</td><td colspan="2"></td></tr>
</table>

* This is best effected by mixing the liquid with molybdate solution and nitric acid in a test tube, and adding a quantity of fairly strong ammonia, so as to cause the latter to float. Somewhere between the two the conditions will be most favourable for the formation of the precipitate, and there a yellow ring will form in presence of a mere trace of phosphoric acid.

Cb.

Add AmHO in excess and filter. To the filtrate add SAm_2 and filter; examine this filtrate by D. Wash the two precipitates separately, transfer them to the same dish, and digest with SAm_2. Filter.

<table>
<tr><td colspan="7">Precipitate—wash, dissolve in HCl (if the precipitate is black and also requires the addition of $KClO_3$ to dissolve it, Ni and Co are present), add a few drops of strong HNO_3, and test a small portion for phosphoric acid by molybdate. The presence of this acid indicates Cr, Al, Ba, Sr, Ca, Mg, as phosphates. (In the absence of phosphoric acid, proceed to examine the solution by Table *Ca.*) Add excess of $NaH_3C_2O_2$ and $H_4C_2O_2$, warm and filter.</td><td rowspan="5">Filtrate—test for phosphoric acid by Mg mixture, its presence indicates Fe, Ni, Co, Zn, Mn, as phosphates.</td></tr>
<tr><td colspan="3">Precipitate—wash, dissolve in HCl, add excess of NaHO in the cold, and filter.</td><td colspan="4">Filtrate—add Fe_2Cl_6 (if no white or reddish precipitate forms on testing a small portion, proceed to add AmHO and Am_2CO_3 to the remainder), as long as a precipitate forms, boil, and filter hot.</td></tr>
<tr><td rowspan="3">Precipitate, reddish brown, indicates Fe.</td><td colspan="2" rowspan="2">Filtrate—boil for some time, and if a precipitate forms, filter.</td><td colspan="3">Filtrate—add AmCl, AmHO, and SAm_2; filter.</td><td rowspan="3">Precipitate, neglect.</td></tr>
<tr><td colspan="2">Filtrate—Add Am_2CO_3.</td><td rowspan="2">Precipitate—examine for Zn, Mn, Ni, Co, Al, Cr, by Table *Ca.*</td></tr>
<tr><td>Precipitate, green, indicates Cr as phosp. Confirm.</td><td>Solution—add excess of acetic acid. A white precipitate indicates Al as phosp. Confirm.</td><td>Precip.—examine by D for Ba, Sr, Ca.</td><td>Filtrate—add Na_2HPO_4. A white precipitate indicates Mg as phos. Confirm.</td></tr>
</table>

D.—*Examination of the Filtrate from* C.

Add AmCl and Am_2CO_3, digest and filter. Examine the filtrate by E. Wash the precipitate and dissolve in HCl, evaporate the solution to dryness, pulverize the residue, and digest it with absolute alcohol; filter.

<table>
<tr><td rowspan="2">Residue—dissolve in water and add K_2CrO_4. A yellow precipitate indicates Ba.</td><td colspan="2">Filtrate—add dilute H_2SO_4, allow to stand, and filter. Digest the precipitate with strong Am_2SO_4 and a little AmHO, and filter.</td></tr>
<tr><td>Residue indicates Sr. Confirm by flame.</td><td>Filtrate—dilute well, and add ammonium oxalate. A white precipitate indicates Ca.</td></tr>
</table>

E.—*Examination of the Filtrate from* D.

Divide it into two portions. To one add Na_2HPO_4 in the cold, a white crystalline precipitate indicates Mg. Evaporate a portion of the remainder and test by the flame for K and Na. Confirm K by $PtCl_4$.

TABLE SHOWING THE BEHAVIOUR OF THE
The vertical columns give the

Metal.	KHO, or NaHO.	K_2CO_3, or Na_2CO_3.	AmHO.
Na	—	—	—
K	—	—	—
Am	—	—	—
Mg	W MgH_2O_2	W $MgCO_3+xMgO$	W MgH_2O_2
Ba	W BaH_2O_2	W $BaCO_3$	No precipitate
Sr	W SrH_2O_2	W $SrCO_3$	No precipitate
Ca	W CaH_2O_2	W $CaCO_3$	No precipitate
Zn	W ZnH_2O_2	W $ZnCO_3+xZnO$	W $\underline{ZnH_2O_2}$
Mn	W MnH_2O_2	W $MnCO_3$	W $\underline{MnH_2O_2}$
Ni	G NiH_2O_2	G $NiCO_3+xNiO$	————
Co	Bl CoH_2O_2+xCoO	P $CoCO_3+xCoO$	Bl $\underline{CoH_2O_2+xCoO}$
Fe^{IV}	R $Fe_2H_6O_6$	R $Fe_2H_6O_6$	R $Fe_2H_6O_6$
Cr	BlG $\underline{Cr_2H_2O_6}$	G Basic carbonate	BG $Cr_2H_2O_6$
Al	W $\underline{Al_2H_6O_6}$	W Basic carbonate	W $Al_2H_6O_6$
As^{III}	—	—	—
Sb^{III}	W $\underline{Sb_2O_3}$	W Sb_2O_3	W Sb_2O_3
Sn^{IV}	W $\underline{SnH_2O_3}$	W SnH_2O_3	W $\underline{SnH_2O_3}$
Sn^{II}	W $\underline{SnH_2O_2}$	—	W SnH_2O_2
Cd	W CdH_2O_2	W $CdCO_3$	W $\underline{CdH_2O_2}$
Cu	Bl CuH_2O	GBl $CuCO_3+xCuO$	GBl $\underline{\text{Basic}}$
Bi	W BiH_3O_3	W $Bi_2O_2CO_3$	W BiH_3O_3
Pb	W $\underline{PbH_2O_2}$	W $PbCO_3+xPbO$	W ————
Hg^{II}	Y HgO	RB $HgCO_3+xHgO$	W $2(NH_2HgCl)$
Hg^{I}	B Hg_2O	—	B Basic
Ag	Br Ag_2O	W Ag_2CO_3	Br $\underline{Ag_2O}$

A line ———— indicates that the precipitate is soluble in excess. The colour of the precipitate
B B = brownish black

formulæ of the precipitates.

Am_2CO_3.	SH_2.	SAm_2.	Other Reagents: Name of Reagent.	Other Reagents: Precipitate.
—	No precipitate	No precipitate	$KSbO_3$	W $NaSbO_3$
—	,,	,,	$PtCl_4$	Y $2KCl, PtCl_4$
—	,,	,,	$PtCl_4$	Y $2AmCl, PtCl_4$
—	,,	,,	Na_2HPO_4	W $MgHPO_4$
W $BaCO_3$	,,	,,	H_2SO_4	W $BaSO_4$
W $SrCO_3$	,,	,,	H_2SO_4	W $SrSO_4$
W $CaCO_3$	,,	,,	$Am_2C_2O_4$	W CaC_2O_4
W $ZnCo_3+xZnO$	,,	W ZnS	—	—
W $MnCO_3$	,,	F MnS	—	—
G $NiCO_3+xNiO$	No pp. if acid	B NiS	$NaClO$	B $Ni_3O_5, 4H_2O$
P $CoCO_3+xCoO$	,,	B CoS	$NaClO$	B $Co_3O_5, 4H_2O$
R $Fe_2H_6O_6$	No precipitate	B FeS	K_4FeCy_6	Bl $Fe_4(FeCy_6)_3$
G Basic carbonate	,,	BlG $Cr_2H_2O_6$	—	—
W Basic carbonate	,,	W $Al_2H_6O_6$	—	—
—	Y As_2S_3	Y As_2S_3	—	—
W Sb_2O_3	O Sb_2O_3	O Sb_2O_3	—	—
W SnH_2O_3	Y SnS_2	Y SnS_2	—	—
W SnH_2O_2	Br SnS	Br SnS	—	—
W $CdCO_3$	Y CdS	Y CdS	—	—
GBl Basic	BB CuS	BB CuS	K_4FeCy_6	RBr Cu_2FeCy_6
W $Bi_2O_2CO_3$	BB Bi_2S_3	BB Bi_2S_3	—	—
W $PbCO_3+xPbO$	B PbS	B PbS	H_2SO_4	W $PbSO_4$
W	B HgS	B HgS	KI	R HgI_2
—	B Hg_2S	B Hg_2S	HCl	W Hg_2Cl_2
—	B Ag_2S	B Ag_2S	HCl	W $AgCl$

is indicated by capitals:—W = white; G = green; Bl = blue; Y = yellow; P = peach; B = black; Br = brown; R = red; F = flesh-coloured.

TABLE SHOWING THE CHARACTERISTIC REACTIONS OF THE COMMON ACIDS.

The vertical columns give the formulæ of the precipitates.

Acid.	Fe_2Cl_6.	$BaCl_2$.	$AgNO_3$.	$CaCl_2$.	$Pb(H_3C_2O_2)_2$.	Other Reagents. Name.	Other Reagents. Precipitate, &c.	Nature of Solution.
H_2SO_4	—	W $BaSO_4$	—	—	—	—	—	Acidulated with HCl.
H_4SiO_4	—	—	—	—	—	AmCl	g H_4SiO_4	
H_4FeCy_6	Bd $Fe_4(FeCy_6)_3$	—	These form pp. with $AgNO_3$ insol. in HNO_3	—	—	$FeSO_4$	Bl $K_2Fe''FeCy_6$	
"	—	—		—	—	$CuSO_4$	RBr Cu_2FeCy_6	
$H_6Fe_2Cy_{12}$	Br Coloration	—		—	—	—	—	
HCyS	R Coloration	—		—	—	—	—	
2HF, SiF_4	Wg BaF_2, SiF	—	—	—	—	—	—	
HCl	—	—	W AgCl	—	—	—	—	Acidulated with HNO_3.
HBr	—	—	YW AgBr	—	—	—	—	
$HBrO_3$	—	—	W $AgBrO_3$	—	—	—	—	
HI	—	—	Y AgI	—	—	$CuSO_4$ + $FeSO_4$	W Cu_2I_2	
HIO_3	—	—	W $AgIO_3$	—	—	—	—	
HCy	—	—	W AgCy	—	—	—	—	
HF	—	—	—	W CaF_2	—	The acid etches glass	—	Acid. with Acetic Acid.
$H_2C_2O_4$	—	—	—	—	—	$CaSO_4$	W CaC_2O_4	
H_2CrO_4	—	—	—	—	Y $PbCrO_4$	—	—	
H_3PO_4	YW $Fe_2P_2O_8$	—	—	—	—	—	—	
$\bar{T}H_2O_2$	—	—	—	W $\bar{T}CaO_2$	—	Forms Ag Mirror	—	Neutral.
$\bar{Ci}H_3O_3$	—	—	—	W $\bar{Ci}_2Ca_3O_6$*	—	—	—	

The capitals indicate the colour of the precipitate:—B = blue; Br = brown; Y = yellow; W = white; R = red; d = dark; l = light; g = gelatinous.

* On boiling with CaH_2O_2.

Directions for Making the Ordinary Reagents used in Laboratories.

ACIDS.

Sulphuric Acid (H_2SO_4), oil of vitriol. Impurities, Pb, As, Fe, Ca, HNO_3, N_2O_4.

Dilute Sulphuric Acid. Pour 1 part by measure of the pure concentrated acid into 5 parts of distilled water contained in a porcelain dish.

Nitric Acid (HNO_3), common. Impurities, H_2SO_4, HCl.

Dilute Nitric Acid. Dilute 1 part of the strong pure acid with 2 parts of water.

Hydrochloric Acid (HCl), common. The impurities are Cl, Fe_2Cl_6, H_2SO_4, SO_2, As.

Dilute Hydrochloric Acid. Dilute 1 part of pure concentrated acid with 3 parts of water.

Nitro-hydrochloric Acid (Aqua regia). Prepare when required by adding 4 parts of strong hydrochloric acid to 1 part of strong nitric acid.

Acetic Acid ($H_4C_2O_2$). Impurities, H_2SO_4, HCl, Cu, Pb, Fe, Ca.

Dilute Acetic Acid. Mix 1 part of pure commercial acid of specific gravity 1·04 with 1 part of water.

Carbonic Acid (H_2CO_3). Make a solution of CO_2 by passing it into cold water.

Sulphurous Acid (H_2SO_3). Make a solution of SO_2 in water and preserve in well-stoppered bottles.

Oxalic Acid ($H_2C_2O_4$). Impurities, Fe, K, Na, Ca. Dissolve 1 part of crystallized acid in 10 parts by measure of water.

Tartaric Acid ($C_4H_6O_6$). Impurities, Ca, H_2SO_4.

Make a solution when required by dissolving 1 part of acid in 3 parts of water.

Hydrofluoric Acid (HF). This acid is best purchased. It should be kept in a guttapercha bottle.

Hydrofluosilicic Acid (H_2SiF_6). Place in a capacious flask 1 part of sand, 1 part of CaF_2, 6 parts of concentrated sulphuric acid, and heat on a sand bath. A wide delivery tube, dipping into a beaker of water containing enough mercury at the bottom to cover the end of the tube, should convey the evolved gas. Filter the solution thus obtained.

Sulphuretted Hydrogen (SH_2). It is best to use this reagent in the gaseous state; it should in all cases be previously washed. A solution may be made and preserved for some time in stoppered bottles rendered opaque by varnish.

ALKALIES.

Sodic Hydrate (NaHO), or *Potassic Hydrate* (KHO). For most purposes of the laboratory sodic hydrate should be used. Dissolve the stick soda in 20 parts of water. Impurities, Al, SiO_2, phosphates, sulphates, and chlorides. Pure sodic hydrate for the separation of alumina can be bought. For organic analysis potash (not soda) of specific gravity 1·27 should be used.

Ammonic Hydrate (NH_4HO). Impurities, sulphate, chloride, carbonate, tarry matter.

Dilute Ammonic Hydrate. A solution of specific gravity ·96 (1 vol. of strong ammonia ·880 and 2 vol. of water) should be used.

Baric Hydrate (BaH_2O_2). Dissolve 1 part of the crystals ($BaH_2O_2 + 8Aq$) in 20 parts of water. Filter, and preserve in well-stoppered bottle.

Calcic Hydrate (CaH_2O_2). Dissolve lime in water, filter, and preserve in stoppered bottle.

SALTS.

Salts of Alkalies.

Sodic Hydric Sulphite. Dissolve 1 part of the salt in 5 parts of water.

Disodic Hydric Phosphate. Impurities, sulphate, chloride, alkaline earthy phosphates. Dissolve the recrystallized salt in 10 parts of water.

Sodic Hypochlorite ($NaClO$). Obtained by passing chlorine into a cold dilute solution of soda, or by treating 1 part of fresh bleaching powder with 8 parts of water, and precipitating the solution with strong sodic carbonate solution. Filter for use.

Sodic Thiosulphate ($Na_2S_2O_3$). Dissolve 1 part of the salt in 30 parts of water.

Sodic Acetate ($NaC_2H_3O_2$). Impurities, sulphates. Dissolve 1 part of the commercial salt (if pure) in in 10 parts of water. The pure salt may be made by neutralizing sodic carbonate with pure acetic acid.

Sodic Acetate and *Acetic Acid* solution. Prepare by dissolving 25 grams of crystallized sodic acetate in 200 c. c. of water, and adding 50 c. c. of strong acetic acid.

Sodic Ammonic Hydric Phosphate (Microcosmic salt) $\left(Na(NH_4)HPO_4\right)$. The salt must be dried and powdered. It can be made as follows: dissolve 7 parts of disodic hydric phosphate and 1 part of ammonic chloride in 2 parts of boiling water and allow to cool, when the salt forms. It is purified by recrystallizing from hot water containing a little ammonia.

Sodic Borate ($Na_2B_4O_7$). Heat the crystals to expel water of crystallization, powder, and preserve in bottles.

Sodic Carbonate (Na_2CO_3). Impurities, chlorides, phosphates, sulphates, silicates. A purer product can be obtained by heating the bicarbonate or by repeated recrystallization of the commercial salt. Dissolve the anhydrous salt in 5 parts of water.

Ammonic Sulphate ($(NH_4)_2SO_4$). Recrystallize the commercial salt after the addition of ammonia, and make a strong solution.

Ammonic Chloride (NH_4Cl). Impurity, iron. Purify the commercial salt by the addition of ammonia, filter, neutralize the filtrate with hydrochloric acid and crystallize. Dissolve in 5 parts of water.

Ammonic Nitrate ($(NH_4)NO_3$). A saturated solution is made when required.

Ammonic Oxalate ($(NH_4)_2C_2O_4$). Recrystallized ammonic oxalate is dissolved in 20 parts of water.

Ammonic Carbonate ($(NH_4)_2CO_3$). Impurities, Pb, Fe, sulphates, chlorides. Scrape the ordinary commercial salt, and then dissolve in 4 parts of water, and add 1 part of ammonia of specific gravity ·880.

Ammonic Hydric Carbonate ($(NH_4)HCO_3$). Pass CO_2 into strong ammonia, dissolve the crystals thus obtained when required.

Ammonic Molybdate ($(NH_4)_2MO_4$). The salt is dissolved in strong ammonia, and the clear fluid decanted into strong nitric acid till the precipitate redissolves. A very delicate reagent for the detection of phosphoric acid is made by taking the following proportions.

60 grams ammonic molybdate
500 c. c. nitric acid (specific gravity 1·4)
400 c. c. ammonia (specific gravity ·96)
400 c. c. water.

Ammonic Sulphide $((NH_4)_2S)$. Saturate 3 parts of ammonia with SH_2, and then add 2 parts of ammonia.

Yellow Ammonic Sulphide $((NH_4)_2S_2)$. Digest the neutral SAm_2 with flowers of sulphur, and filter. This reagent is best bought.

Ammonic Arseniate is prepared by neutralizing arsenic acid with ammonic carbonate and evaporating to dryness. Dissolve in water.

Potassic Sulphate (K_2SO_4). Dissolve 1 part of the salt in 10 parts of water.

Potassic Nitrite (KNO_2). Dissolve 1 part of the commercial salt in 2 parts of water when required.

Potassic Iodide (KI). The commercial salt is dissolved in 50 parts of water. Impurities, iodate, carbonate.

Potassic Chromate (K_2CrO_4). Impurities, sulphates. Dissolve in 10 parts of water.

Potassic Bichromate (K_2CrO_7). Dissolve in 10 parts of water. Impurities, sulphates.

Potassic Metantimoniate $(KSbO_3)$. Heat 1 part of Sb with 4 parts of nitre in a crucible; boil the powdered mass with 12 parts of water for some hours, then filter.

Potassic Ferrocyanide (K_4FeCy_6). Dissolve the commercial salt in 12 parts of water.

Potassic Ferricyanide ($K_6Fe_2Cy_{12}$). Dissolve 1 part of the salt in 12 parts of water when required.

Potassic Sulphocyanate (KCyS). Dissolve 1 part of the salt in 10 of water.

Salts of Alkaline Earths.

Baric Chloride ($BaCl_2$). Purify the commercial salt if not pure by first passing SH_2 and then crystallizing. Dissolve in 10 parts of water.

Baric Nitrate (BaN_2O_6). Dissolve in 15 parts of water.

Baric Carbonate ($BaCO_3$). To a solution of $BaCl_2$ add ammonia and then excess of ammonic carbonate, and wash the precipitate, which must then be preserved moist in wide-mouthed stoppered bottles.

Calcic Chloride ($CaCl_2$). Impurity, Fe. Dissolve in 5 parts of water.

Calcic Sulphate ($CaSO_4$). Make the solution by shaking up gypsum with water and then filtering.

Magnesic Sulphate ($MgSO_4$). Dissolve in 10 parts of water.

Magnesia Mixture (see page 408).

Salts of Heavy Metals.

Ferrous Sulphate ($FeSO_4$). Dissolve in 10 parts of *cold* water.

Ferric Chloride (Fe_2Cl_6). Dissolve pure $Fe_2H_6O_6$ in pure HCl. Leave an excess of $Fe_2H_6O_6$, and filter. When cool dilute with 2 volumes of water.

Cobaltous Nitrate (CoN_2O_6). Dissolve in 10 parts of water. Impurities, Fe, Ni, &c.

Plumbic Acetate ($PbC_4H_6O_4$). Dissolve in 10 parts of water.

Lead free from silver is prepared by precipitating pure plumbic acetate with metallic zinc.

Plumbic Peroxide (PbO_2). Digest red lead in hot dilute nitric acid, filter, and wash.

Cupric Sulphate ($CuSO_4$). Impurities, Fe, Zn. Dissolve the recrystallized salt in 10 parts of water.

Cupric Chloride ($CuCl_2$). Dissolve CuO in HCl, keeping the former in excess; filter.

Cuprous Chloride (Cu_2Cl_2). Prepared by digesting $CuCl_2$ with Cu and HCl.

Mercuric Chloride ($HgCl_2$). Dissolve corrosive sublimate in 20 parts of water with the aid of heat.

Mercurous Nitrate ($Hg_2N_2O_6$). Dissolve the commercial salt in 20 parts of water acidulated with 1·2 part of nitric acid. Put some metallic mercury into the filtered solution.

Auric Chloride ($AuCl_3$). Dissolve gold in aqua regia, evaporate on the water bath, add water, and filter.

Platinic Chloride ($PtCl_4$). Dissolve scrap platinum in aqua regia, add ammonic chloride, and evaporate on the water bath. Wash the residue with alcohol; decompose it by ignition. Dissolve the resulting platinum in aqua regia; evaporate to dryness with HCl, and dissolve in 10 parts of water.

Argentic Nitrate ($AgNO_3$). Dissolve the commercial salt in 20 parts of water.

Stannous Chloride ($SnCl_2$). Dissolve pure tin in strong HCl in presence of platinum foil. Dilute with four volumes of dilute hydrochloric acid. Keep in a stoppered bottle containing some pieces of granulated tin.

MISCELLANEOUS.

Chlorine (Cl_2). Pass the gas into cold water, and preserve in well-stoppered bottles in a dark place.

Hydric Peroxide (H_2O_2). Suspend baric peroxide in water, kept cool, and pass a current of CO_2. Filter off the precipitate from the solution, which should be dilute.

Nessler's Solution. Take 7 grams of KI and 3·2 grams of $HgCl_2$; dissolve the former in 20 c. c. of water, and then the latter in 60 c. c. of water; add the mercury solution to the other with constant shaking until the precipitate ceases to redissolve. Then add 120 c. c. of potash, and filter.

Indigo Solution. Take 1 part of powdered indigo and 4 to 6 parts of fuming sulphuric acid; add the indigo in small portions to the acid with constant stirring, at the same time preventing rise of temperature. After the solution has stood a day or two, pour it into 20 times its volume of water, and filter.

Litmus Solution. Boil powdered litmus with distilled water.

Litmus Papers. Take Swedish filter paper, cut it into strips, and soak these in hot water. After they are well drained, soak them in the above litmus solution, which, if red papers are required, has been previously treated with a few drops of H_2SO_4, and if blue papers are required, with a few drops of potash. Dry and cut up, then preserve in stoppered bottles.

Turmeric Papers. Steep 1 part of bruised turmeric in 5 parts of weak alcohol. Make the papers with this solution as directed for litmus papers. See also pages 288 and 408.

VOLUMETRIC ANALYSIS.

Factors useful in Volumetric Analysis.

Normal nitric acid	× ·063	= HNO_3.
” ”	× ·054	= N_2O_5.
” ”	× ·101	= KNO_3.
Metallic iron	× ·375	= HNO_3.
” ”	× ·6018	= KNO_3.

1 c.c. $\frac{N}{10}$ permanganate, bichromate, or thiosulphate .. .. .. = ·0056 gram Fe.
·0072 gram FeO.
·0080 gram Fe_2O_3.
·0392 double iron salt.

Copper = 63·5

1 c.c. $\frac{N}{10}$ solution	=	·00635 gram Cu.
Iron × 1·1314	=	Copper.
” × 1·4171	=	CuO.
” × 4·453	=	Crystallized copper sulphate, $CuSO_4$, $5OH_2$.
Double iron salt × ·16163	=	Copper.
” ” × ·2024	=	CuO.
” ” × ·6351	=	$CuSO_4$, $5OH_2$.

Zinc = 65.

1 c.c. $\frac{N}{10}$ solution	=	·00325 gram zinc.
Metallic iron × ·5809	=	Zn.
” ” × ·724	=	ZnO.
Double iron salt × ·08298	=	Zn.
” ” × ·1034	=	ZnO.

Mn — .

Mn = 55, MnO = 71, MnO_2 = 87.
Potassium ferrocyanide × ·0842 = MnO.
Double iron salt × ·0911 = MnO.
Metallic iron × ·7768 = MnO_2.
Crystallized oxalic acid × ·6916 = MnO_2.
Double iron salt × ·111 = MnO_2.

1 c.c. $\frac{N}{10}$ solution = ·00355 gram MnO = ·004357 gram MnO_2.

Mn_2O_3 = O = Cl_2.
Mn_3O_4 = O = Cl_2.
MnO_2 = O = Cl_2.
MnO_3 = O_2 = $2Cl_2$.
Mn_2O_7 = 5O = $5Cl_2$.

Lead = 207.

1 c.c. $\frac{N}{10}$ permanganate .. .. = ·01035 gram lead.
1 c.c. normal oxalic acid .. .. = ·1035 gram lead.
Metallic iron .. .. × 1·848 = Lead.
Double iron salt .. × ·264 = „
Crystallized oxalic acid × 1·643 = „

Mercury = 20.

1 c.c. $\frac{N}{10}$ solution .. .. = ·0200 gram Hg.
„ „ .. .. = ·0208 gram Hg_2O.
„ „ .. .. = ·0271 gram $HgCl_2$.
Double iron salt × ·5104 = Hg.
„ „ × ·6914 = $HgCl_2$.

Chromium = 52·5.

Metallic iron	×	·3123 =	Cr.
" "	×	·5981 =	CrO_3.
" "	×	·8784 =	Potassium bichromate.
" "	×	1·926 =	Lead chromate.
Double iron salt	×	·0446 =	Cr.
" "	×	·0854 =	CrO_3.
" "	×	·1255 =	Potassium bichromate.
" "	×	·275 =	Lead chromate.

1 c.c. $\frac{N}{10}$ solution = ·003349 gram CrO_3.
" " = ·00492 gram $K_2Cr_2O_7$.

Iodine = 127.

1 c.c. $\frac{N}{10}$ thiosulphate = ·0127 gram iodine.
" " = ·0166 gram KI.

Cyanogen, CN = 26.

1 c.c. $\frac{N}{10}$ silver solution = ·0052 gram CN.
" " = ·0054 gram HCN.
" " = ·01302 gram KCN.
1 c.c. $\frac{N}{10}$ iodine = ·003255 gram KCN.

Potassium Ferrocyanide.

$K_4FeCy_6+3H_2O$ = 422.

Metallic iron	×	7·541 =	Crystallized salt.
Double iron salt	×	1·077 =	" "

Potassic Ferricyanide.

$$K_6Fe_2Cy_{12} = 658.$$

Metallic iron	× 5·88	=	Potassium ferricyanide.
Double iron salt	× 1·68	=	,, ,,
$\frac{N}{10}$ thiosulphate	× ·0329	=	,, ,,

Sulphuretted Hydrogen.

$$H_2S = 34.$$

1 c.c. $\frac{N}{10}$ arsenious solution = ·00255 gram H_2S.

TABLE FOR THE ESTIMATION OF MIXTURES OF SODIUM AND POTASSIUM CARBONATES BY TITRATION WITH NORMAL NITRIC ACID.

K_2CO_3. Na_2CO_3. Grams.		C. C. of Normal Acid.	K_2CO_3. Na_2CO_3. Grams.		C. C. of Normal Acid.
1·00 + ·00	require	14·47	·45 + ·55	require	16·89
·95 + ·05	,,	14·69	·40 + ·60	,,	17·11
·90 + ·10	,,	14·92	·35 + ·65	,,	17·33
·85 + ·15	,,	15·14	·30 + ·70	,,	17·55
·80 + ·20	,,	15·35	·25 + ·75	,,	17·76
·75 + ·25	,,	15·57	·20 + ·80	,,	17·97
·70 + ·30	,,	15·79	·15 + ·85	,,	18·19
·65 + ·35	,,	16·01	·10 + ·90	,,	18·40
·60 + ·40	,,	16·23	·05 + ·95	,,	18·62
·55 + ·45	,,	16·45	00 + 1·00	,,	18·84
·50 + ·50	,,	16·67			

Table for the Systematic Analysis of Alkalies, Alkaline Earths, and Acids.

Substance.	Formula.	Molecular Weight.	Quantity to be weighed so that 1 c. c. of Normal Solution = 1 per cent. of Substance.	Normal Factor.
			Grams.*	
Sodium oxide	Na_2O	62	3·1	·031*
„ hydrate	$NaHO$	40	4·0	·040
„ carbonate ..	Na_2CO_3	106	5·3	·053
„ bicarbonate ..	$NaHCO_3$	84	8·4	·084
Potassium oxide	K_2O	94	4·7	·047
„ hydrate ..	KHO	56	5·6	·056
„ carbonate ..	K_2CO_3	138	6·9	·069
„ bicarbonate	$KHCO_3$	100	10·0	·100
Ammonia	NH_3	17	1·7	·017
Ammonium carbonate ..	$(NH_4)_2CO_3$	96	4·8	·048
Calcium oxide (lime) ..	CaO	56	2·8	·028
„ hydrate	CaH_2O_2	74	3·7	·037
„ carbonate ..	$CaCO_3$	100	5·0	·050
Barium hydrate	BaH_2O_2	171	8·55	·0855
„ „ (cry.) ..	$BaH_2O_2,8H_2O$	315	15·75	·1575
„ carbonate ..	$BaCO_3$	197	9·85	·0985
Strontium oxide	SrO	103·5	5·175	·0575
„ carbonate ..	$SrCO_3$	147·5	7·375	·07375
Magnesium oxide	MgO	40	2·00	·020
„ carbonate ..	$MgCO_3$	84	4·20	·042
Nitric acid	HNO_3	63	6·3	·063
Hydrochloric acid	HCl	36·5	3·65	·0365
Sulphuric acid	H_2SO_4	98	4·9	·049
Oxalic acid	$H_2C_2O_4$	126	6·3	·063
Acetic acid	$H_4C_2O_2$	60	6·0	·060
Tartaric acid	$H_6C_4O_6$	150	7·5	·075
Citric acid	$C_6O_7H_8+H_2O$	210	7·0	·070

In order to find the amount of pure substance present in the material examined, multiply the number of c. c. by the "normal factor."

* In using grain weights, move the decimal place one figure to the right in both columns.

Table for approximately determining the Proportion of Sodium and Potassium in Mixed Chlorides.

2·71 grams of the pure, dry, mixed chlorides are dissolved in water and the solution made up to 100 c. c. The chlorine in 10 c. c. of this solution is then estimated by $\frac{N}{10}$ silver nitrate solution and chromate indicator.

C.c. $\frac{N}{10}$ Silver used.	Per cent. of NaCl.	C.c. $\frac{N}{10}$ Silver used.	Per cent. of NaCl.
36·3	0	39·3	30
36·4	1	39·8	35
36·5	2	40·3	40
36·6	3	40·8	45
36·7	4	41·3	50
36·8	5	41·8	55
37·3	10	42·3	60
37·8	15	42·8	65
38·3	20	43·3	70
38·8	25	43·8	75

TABLE SHOWING THE ALTERATION OF THE VOLUME OF GLASS VESSELS BY HEAT, THE VOLUME AT 15° C. BEING TAKEN AS UNITY.

Temp. °C.	Volume.	Temp °C.	Volume.	Temp °C.	Volume.
0	·99961210	15	1·00000000	30	1·00038790
1	·99963796	16	1·00002586	35	1·00051720
2	·99966382	17	1·00005172	40	1·00064650
3	·99968968	18	1·00007758	45	1·00077580
4	·99971554	19	1·00010344	50	1·00090510
5	·99974140	20	1·00012930	55	1·00103440
6	·99976726	21	1·00015516	60	1·00116370
7	·99979313	22	1·00018102	65	1·00129300
8	·99981898	23	1·00020688	70	1·00142230
9	·99984484	24	1·00023274	75	1·00155160
10	·99987070	25	1·00025860	80	1·00168090
11	·99989656	26	1·00028446	85	1·00181020
12	·99992242	27	1·00031032	90	1·00193950
13	·99994828	28	1·00033618	95	1·00206880
14	·99997414	29	1·00036204	100	1·00219810

THE WEIGHT OF 1000 C. C. OF PURE WATER AT t° C. WHEN DETERMINED BY MEANS OF BRASS WEIGHTS, IN AIR OF 0° C., AND OF A TENSION ·76 M., IS EQUAL TO 1000 − x GRAMS.

t°	0	1	2	3	4	5	6	7	8	9
x	1·25	1·20	1·15	1·13	1·12	1·12	1·14	1·16	1·21	1·27
t°	10	11	12	13	14	15	16	17	18	19
x	1·34	1·43	1·52	1·63	1·76	1·89	2·04	2·20	2·37	2·55
t°	20	21	22	23	24	25	26	27	28	29
x	2·74	2·95	3·17	3·39	3·63	3·88	4·13	4·39	4·67	4·94

Preparation of the Solutions used in Volumetric Analysis.

(In all cases *distilled water* is meant, unless otherwise stated).

Indicators used in Alkalimetry.

Litmus Solution. Digest 10 grams of solid litmus with 500 c. c. of water for some hours, decant the clear liquid, add a few drops of dilute nitric acid to produce a violet colour, and preserve in an open bottle. Or, better, boil the powdered litmus twice with 80 per cent. spirit, rejecting the liquid; then digest the litmus with cold water till all soluble colouring matter is dissolved; allow the decoction to settle. Next add a few drops of sulphuric acid until the liquid becomes quite red, boil, then add baryta water until the neutral tint appears.

Cochineal Solution. Boil 3 grams of the powder in 250 cub. cent. of 20 per cent. spirit.

Turmeric Paper. Digest the root in small pieces, first several times with water, and then with alcohol. Strips of Swedish paper dipped into the solution and dried are sometimes used in volumetric analysis.

Normal Acid and Alkaline Solutions.

Normal Sodium Carbonate. Dissolve 53 grams of pure, dry monocarbonate, prepared by igniting the bicarbonate to redness, in water, and make up to 1 litre.

N Sulphuric Acid. Dilute about 30 c.c. of pure sulphuric acid (sp. gr. 1·840) to 1 litre; then determine the strength of this solution by titration with normal alkali or alkaline carbonate, and dilute so as to make 1 c. c. of the sulphuric acid neutralize 1 c. c. of the alkali; after dilution check the strength by further titration.

N Oxalic Acid. Dissolve 63 grams of pure (recrystallized) oxalic acid, dried between paper, in 1 litre of water.

N Hydrochloric Acid. Dilute 181 grams of the pure acid, of sp. gr. 1·10, to 1 litre; check by titration with $\frac{N}{10}$ silver solution or by sodium carbonate.

N Nitric Acid. Take pure nitric acid and dilute to 1 litre. The strength of this solution must be ascertained, and the acid diluted accordingly. The most exact method of checking the nitric acid is by pure calcium carbonate, 1 gram of which requires 20 c. c. of normal acid.

N Caustic Alkali. Take about 42 grams of *pure* sodium hydrate and dissolve in 800 c. c. of water; titrate with normal acid and dilute until it corresponds with the acid volume for volume. Normal potassium hydrate may be made in a similar manner.

N Ammonium Hydrate is made by diluting strong ammonia to the required strength, and checking by titration with standard acid.

The following Table gives the strengths of the above solutions:—

1 c.c. of

Normal sodium carbonate, = ·053 gram Na_2CO_3
= ·030 gram CO_3 = ·022 gram CO_2.
Normal sulphuric acid, = ·049 gram H_2SO_4
= ·048 gram SO_4 = ·040 gram SO_3.
Normal oxalic acid, = ·063 gram $H_2C_2O_4$, $2H_2O$
= ·045 gram $H_2C_2O_4$ = ·044 gram C_2O_4.
Normal hydrochloric acid, = ·0365 gram HCl
= ·0355 gram Cl.
Normal nitric acid, = ·063 gram HNO_3
= ·062 gram NO_3 = ·054 gram N_2O_5.
Normal sodium hydrate, = ·040 gram NaHO
= ·031 gram Na_2O = ·023 gram Na.
Normal potassium hydrate, = ·056 gram KHO
= ·047 gram K_2O = ·039 gram K.
Normal ammonium hydrate, = ·017 gram NH_3
= ·018 gram NH_4 = ·035 gram $(NH_4)HO$.

N Ammonio-copper Solution for Acids. Dissolve pure recrystallized copper sulphate, or nitrate, in water, and add ammonia till the precipitate which first forms is nearly dissolved; now filter the liquid, and titrate by normal sulphuric or nitric acid. As soon as the neutral point is reached, a permanent precipitate forms. Dilute till the solutions correspond to normal acid.

$\frac{N}{10}$ *Potassium Permanganate Solution.* Dissolve 3·16 grams of the pure salt to 1 litre.

1 c.c. = ·00316 gram $K_2Mn_2O_8$
= ·0056 gram Fe.
17·85 c.c. = ·1 gram Fe.

This solution should always be titrated before use.

Titration by $Fe(NH_4)_2S_2O_8$, $6H_2O$,

$$\cdot 7 \text{ gram} = \cdot 1 \text{ gram Fe.}$$

Titration by oxalic acid,

$$\cdot 1125 \text{ gram} = \cdot 1 \text{ gram Fe.}$$

$\frac{N}{10}$ *Potassium Bichromate Solution.* Dissolve 4·917 grams to 1 litre; the salt is dried by gentle ignition.

$$\begin{aligned} 1 \text{ c.c.} &= \cdot 004917 \text{ gram } K_2Cr_2O_7 \\ &= \cdot 0056 \text{ gram Fe} \\ &= \cdot 0072 \text{ gram FeO} \\ &= \cdot 0127 \text{ gram I} \\ &= \cdot 0069 \text{ gram Pb.} \end{aligned}$$

$\frac{N}{10}$ *Iodine Solution.* Dissolve 12·7 grams of sublimed iodine in water containing about 18 grams KI, and dilute to 1 litre.

$\frac{N}{10}$ *Sodium Thiosulphate Solution.* Dissolve 24·8 grams of crystallized salt, $Na_2S_2O_3$, $5H_2O$, to 1 litre, and check with decinormal iodine.

Starch Solution. Pour 200 parts of boiling water upon 1 part of powdered starch, allow to settle, and decant the clear liquid. The strength of the last two standard solutions is as follows:

$$\begin{aligned} 1 \text{ c.c.} &= \cdot 0127 \text{ gram I} \\ &= \cdot 0158 \text{ gram } Na_2S_2O_3 \\ &= \cdot 0248 \text{ gram } Na_2S_2O_3,\ 5H_2O \\ &= \cdot 00495 \text{ gram } As_2O_3. \end{aligned}$$

$\frac{N}{10}$ *Sodium Arsenite Solution.* Dissolve 4·95 of the purest sublimed arsenious anhydride in 250 c. c. of water in which about 25 grams of the purest sodium monocarbonate has previously been dissolved. The solution is effected by boiling and shaking for some time. Finally, dilute to 1 litre. Test this solution by standard iodine.

1 c. c. = ·0127 gram I = ·00355 gram Cl.

$\frac{N}{10}$ *Silver Nitrate Solution.* Dissolve 10·8 grams of pure silver in pure dilute nitric acid, gently heated, and dilute to 1 litre; or, if a neutral solution is required, take 17 grams of pure silver nitrate and dissolve in water to 1 litre.

1 c. c. = ·0108 gram Ag = ·017 $AgNO_3$
= ·00355 gram Cl.

$\frac{N}{10}$ *Sodium Chloride Solution.* Dissolve 5·85 grams of pure sodium chloride, dried by gentle ignition, to 1 litre.

1 c. c. = ·00585 gram NaCl
= ·00355 gram Cl
= ·0108 gram Ag.

N Barium Chloride Solution. Dissolve 122·00 grams of barium chloride, dried between paper, to 1 litre.

$$
\begin{aligned}
1 \text{ c. c.} &= \cdot 049 \text{ gram } H_2SO_4 \\
&= \cdot 048 \text{ gram } SO_4 \\
&= \cdot 040 \text{ gram } SO_3 \\
&= \cdot 1220 \text{ gram } BaCl_2, 2OH_2 \\
&= \cdot 104 \text{ gram } BaCl_2 \\
&= \cdot 0685 \text{ gram Ba.}
\end{aligned}
$$

Stannosum Chloride Solution. Dissolve about 6 grams of pure tin, in thin pieces, in about 200 c. c. of strong hydrochloric acid, by the aid of pieces of platinum foil; dilute to 1 litre, and preserve in stoppered bottles. This solution must be titrated with $\frac{N}{10}$ iodine solution every day when used.

Standard Iron Solution for Colorimetric Estimation of Iron. Dissolve 1·004 gram of pianoforte wire in aqua regia, precipitate as hydrate with ammonia, wash, dissolve in a little hydrochloric acid, and dilute to 1 litre.

$$
\begin{aligned}
1 \text{ c. c.} &= \cdot 001 \text{ Fe} \\
&= \cdot 0012857 \text{ FeO.}
\end{aligned}
$$

A more dilute solution is made by diluting the above solution with nine times its bulk of water; then

$$1 \text{ c. c.} = \cdot 0001 \text{ gram I.}$$

Iudicator. 1 part of potassic ferrocyanide in 10 of water.

Standard Copper Sulphate Solution. Dissolve 39·291 grams of crystallized salt, dried between paper ($CuSO_4$, $5OH_2$), to 1 litre.

$$1 \text{ c. c.} = \cdot 01 \text{ gram Cu.}$$

Standard Copper Sulphate Solution for Colorimetric Estimation of Copper. Dissolve ·3929 gram of the crystallized salt to 1 litre.

1 c. c. = ·0001 gram Cu.

The *Ammonium Nitrate* solution, which is used in this process, is made by dissolving 100 grams to 1 litre; and the *Potassium Ferrocyanide* solution, by dissolving 1 part in 25 parts of water.

Standard Zinc Sulphate Solution. Dissolve 44·12 grams of pure crystallized zinc sulphate to 1 litre. The salt should be dried between paper.

1 c. c. = ·01 gram Zn.

"*Standard Salt Solution.*" Dissolve 5·4145 grams of pure NaCl to 1 litre.

1 c. c. = ·01 gram Ag.

"*Decimal Salt Solution.*" Dilute 100 c. c. of the "Standard Salt Solution" to 1 litre.

1 c. c. = ·001 gram Ag.

"*Decimal Silver Solution.*" Dissolve 1 gram of pure silver in warm nitric acid, and dilute to 1 litre.

1 c. c. = ·001 gram Ag.

Standard Zinc Solution for Alkaline Sulphides. Dissolve 3·253 grams of pure zinc in hydrochloric acid, supersaturate with ammonia, and dilute to 1 litre.

1 c. c. = ·0016 gram sulphur
= ·0039 gram sodium sulphide
= ·00551 gram potassium sulphide
= ·0034 gram ammonium sulphide.

Standard Solutions for Estimation of Phosphates.

Standard Uranium Solution. Take about 40 grams of uranium acetate, dissolve in water, add about 25 c. c. of glacial acetic acid, and make up to 1 litre. This solution is then titrated against the sodium phosphate and diluted until 20 c. c. are equivalent to 50 c. c. of the latter.

1 c. c. = ·005 gram P_2O_5
= ·00669 gram PO_4.

Standard Sodium Phosphate Solution. Take 10·085 grams of pure, crystallized, non-effloresced, disodium hydrogen phosphate, dried between paper, and dissolve to 1 litre. Check this solution by evaporating 50 c. c. to dryness and igniting. The residue should weigh ·1874 gram.

50 c. c. = ·1 gram P_2O_5.

Sodium Acetate Solution. Dissolve 100 grams of the salt in water, add 100 c. c. of pure acetic acid (sp. gr. 1·04), and dilute to 1 litre. Exact quantities are not necessary.

Standard Tannin Solution. Dissolve 2 grams of pure tannin to 1 litre.

1 c. c. = ·002 gram tannin.

Standard Copper Solution (Fehling). Dissolve 34·64 grams of pure crystallized copper sulphate in water; in another vessel dissolve 173 grams of Rochelle salt in 480 c. c. of soda (sp. gr. 1·14); mix the two solutions, and make up to 1 litre.

1 c. c. = ·005 gram $C_6H_{12}O_6$.

Standard Mercuricum Cyanide Solution (*for Sugar*). Dissolve 10 grams of mercuricum cyanide in 600 c. c. of water, add 100 c. c. of soda (sp. gr. 1·145), and dilute to 1 litre.

1 c. c. = ·04 $C_6H_{12}O_6$.

Standard Mercuricum Nitrate Solution (*for* Cl *in Urine*). Dissolve 18·42 grams of the *purest* red oxide in nitric acid (1·20), evaporate off excess of acid, and dilute to 1 litre.

1 c. c. = ·01 gram NaCl
= ·006065 gram Cl.

Standard Mercuricum Nitrate (*for Urea*). Dissolve 77·2 grams of red oxide, as before, and dilute to 1 litre.

1 c. c. = ·01 gram urea.

Standard Barium Chloride (*for Sulphates in Urine*). Dissolve 30·5 grams of barium chloride, dried between paper, and dilute to 1 litre.

1 c. c. = ·01 gram SO_3.

REAGENTS USED IN WATER ANALYSIS.

Nessler's Solution. Take 62·5 grams of KI and dissolve in 250 c. c. of water, reserve about 10 c. c., and then add to the larger portion a solution of $HgCl_2$ until the precipitate ceases to be dissolved. Now add the 10 c. c. of KI solution, and continue the cautious addition of $HgCl_2$ solution until a slight permanent precipitate forms.

Then dissolve 150 grams of stick potash in 150 c. c. of distilled water, and when cool add it gradually to the above solution, and dilute the mixture to 1 litre.

Standard Ammonium Chloride. Dissolve 1·9107 gram of dry ammonium chloride to 1 litre, then take 100 c. c. of this solution and dilute to 1 litre.

1 c. c. = ·00005 gram N.

Or, dissolve 1·5735 gram to 1 litre, and treat as above.

1 c. c. = ·00005 gram NH_3.

Standard Water for Hardness. Dissolve ·2 gram of pure $CaCO_3$ in HCl without loss, and drive off excess of HCl by one or two evaporations. Dissolve to 1 litre.

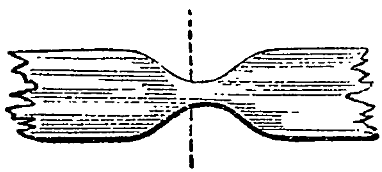
Standard Soap Solution. Take 150 parts of lead plaster (emplast. plumbi) and 40 parts of dry potassic carbonate, mix well in a mortar, and then add spirit (methylated) to form a cream; allow to stand for some hours, then throw the mass on to a filter and wash with spirit. The soap solution thus obtained must be diluted with a mixture of one volume of distilled water and two of spirit (considering the soap solution as spirit), until 14·25 c.c. are required to form a permanent lather with 50 c. c. of "Standard Water for Hardness."

Chemical Manipulation.

To bend Glass Tube.—Heat the tube in the broad flame of an ordinary fish-tail or bat's-wing burner until it begins to bend by its own weight. Then it may easily be bent to the required shape without creasing if removed from the flame. In bending wide tubes (say ·5 inch diameter), it is better either to heat a considerable length of them to redness in a charcoal or combustion furnace, and then make the required bend, or to heat successive portions in the large blow-pipe flame, and bend each portion, and so make the bend by degrees.

To draw a Piece of Tube out to a Jet.—Heat the glass in the blow-pipe flame, at the point where the jet is required, while slowly turning it round, until it thickens. When it is heated equally all round, withdraw it from the flame and draw it out to the required jet. Next cut off at the middle of the narrow part, and heat the end in the flame for a moment to fuse the sharp edges.

To mend a Test-tube.—Test-tubes frequently break at the bottom, and may then be mended as follows:—Fasten a piece of scrap tube on to the broken end by making both soft in the flame, and immediately draw off the test-tube as near as possible to the broken end. The fine point of the blow-pipe flame must then be directed upon the narrowed portion so as to produce an extremely narrowed neck as shown, and the two portions must then be severed by drawing off at the narrowed point. This leaves a small lump of glass; to remove this, heat the lump in the flame until



it is soft, and blow it out to a small bubble at the end of the tube. Now heat the whole end in a large blow-pipe flame, or in the flame of a good Bunsen burner, keeping it turning all the time, until it shrinks-in regularly to a flattened hemisphere. Then blow gently into the tube, when the end expands into a uniformly thin hemispherical bottom. The small tubes of hard glass for use in blow-pipe analysis are made in the same way.

To cut Glass Tube.—To cut off ordinary quill tubing, nick the tube with the edge of a sharp three-cornered file (if the file is sharp, one stroke across the glass is sufficient), and then placing the thumbs one on each side of the nick give the hands a quick movement as if to bend the tube, which then easily snaps off. Thick, wide tubing is cut by filing a deeper nick into it some distance round, and wrapping it in a towel before attempting to break it. The end of a combustion tube is trimmed by the pincers. The tube is held in the left hand, and the pincers in the right; one of the handles being between the thumb and forefinger, and the other between the two last fingers. By moving the latter handle and at the same time smartly turning the wrist, a nibbling motion is given to the points of the pincers, easily enabling the operator to level the end of the tube, which must afterwards be fused for a moment in the blowpipe flame.

Thin tubes cannot be cut by the file, it is better to lead a crack round them by a hot glass rod. Broken flasks and bottles may often be put to valuable use by cutting them in the same way. A crack is started by the pincers, or by pressing a hot rod upon them, and then touching the heated part with the wet finger; this is then led round the vessel in any direction by keeping the end of the hot rod a little in advance of the crack.

To grind Glass.—The ends of thick tubes may be ground level upon a stone with turpentine, the addition of sand, or, still better, emery powder increases the action.

To fuse a Platinum Wire into a Tube.—Draw out the tube to a narrow jet and insert the clean end of the wire, then heat the end in the flame until the glass shrinks and clasps the wire. Cool slowly.

To make a T piece.—The glass for this purpose must be soft; lead glass, however, is not the best. Cut two pieces of the same tube into convenient lengths, and close the end of one. Then heat the closed piece at one point near the middle by the point of the flame. When the spot is well heated, blow out a bubble, and break this by a tap upon the table. This should leave a hole about as large as the diameter of the tube. Now heat the projecting edges of this hole and the end of the second piece of tube in the same flame, keeping the unclosed end of the first tube stopped by the finger. When the glass is hot, bring the end of the second tube and the sides of the hole together, withdraw the glass from the flame and blow gently into the tube. This gives an imperfectly made joint. Now direct the point of a hot flame upon the joint until the two portions forming the juncture fuse together and shrink in. While the tube is hot, blow in gently to expand the shrunken part; go round the juncture in this way until the line of division disappears. Cool slowly. In the same way two pieces of tube are joined in a straight line, by heating the two ends, bringing them together, and then going round the joint till it disappears.

To clean Vessels.—A mop made by fixing a bit of sponge to the end of a thick wire is very useful in cleaning test-tubes. Care must be taken that no projecting portion of the wire is left to break the bottom of the tube. According to the solubility of the substance defiling the vessel to be cleaned, a little common acid or alkali may be used: but in very many cases water alone suffices. Vessels contaminated with substances of the nature of pitch, tar, &c., are cleaned by heating a little strong sulphuric acid in them. To clean evaporating basins, beakers, &c., a little sea sand (which has no sharp edges) or furnace ashes may be used to scour them. Platinum crucibles are cleansed by gentle scouring with sea sand and the finger. Sometimes a little acid sulphate of potassium fused in them, will remove obstinate impurities. Aqua regia should never be used to clean platinum. All vessels must finally be rinsed with distilled water.

To remove Stoppers that have become fixed.—Heat the neck of the bottle by pouring hot water round it, or by rotating it once quickly in a flame; this expands the neck and allows the stopper to be withdrawn; or tap the stopper gently with some wooden object until it is loose. Sometimes a stopper may be extracted by holding the bottle in the hand, inserting the flat part of the stopper into a crevice of a door, &c., and turning the bottle. Stoppers may often be removed by soaking in hot water or by placing a little oil round them, which after a time sinks in and loosens them.

To cleanse Mercury.—Leave the mercury in a flat dish with dilute nitric acid, containing nitrate of mercury, and stir occasionally for some hours.

Sulphuric acid diluted with twice its weight of water may also be used.

For gas analysis, mercury is cleansed and dried by placing it in a funnel tube, stoppered at top and bottom, together with strong sulphuric acid. The mercury is introduced at the top and drawn off at the bottom. It is often advisable to filter mercury through a filter, made by bending a piece of writing paper in the usual way and making a small pin hole at the bottom. Faraday recommends that before being filtered, the mercury should be shaken in a bottle with a little powdered lump sugar, previously slightly damped by breathing several times into the bottle containing it. This removes scum.

Faraday's Cap Cement.—This is of great use in a laboratory. It is made by melting together five parts of resin, and one part of yellow beeswax, and then adding one part of venetian red or red ochre. The cement should be stirred as long as possible while cooling.

A soft Cement is made by taking yellow beeswax one part, turpentine one part, and a little venetian red to colour.

Linseed Meal is useful as a lute in some cases. Mix up the meal to a paste with water, and apply to the joint. The use of milk, lime water, or weak glue in the preparation of this lute, increases its strength.

Cements.—A useful cement is made by dissolving the best glue in acetic acid; and for mending lass articles, a good cement is made by mixing white of egg with quick lime into a paste.

LIST OF NAMES GIVEN IN THE OLDER LANGUAGE OF CHEMISTRY TO VARIOUS COMPOUNDS.

Old Name.	Modern Name.
Salt (ammoniacal, fixed) ..	Calcium chloride.
„ (ammoniacal, secret) of Glauber.	Ammonium sulphate.
„ (arsenical, neutral) of Macqueer.	Potassium hydrogen arsenate.
„ (bitter, cathartic).. ..	Magnesium sulphate.
„ (common)	Sodium chloride.
„ (digestive) of Sylvius ..	Potassium acetate.
„ (diuretic)	Potassium acetate.
„ (Epsom)..	Magnesium sulphate.
„ (febrifuge) of Sylvius ..	Potassium chloride.
„ (fusible)	Ammonium phosphate.
„ (fusible) of urine	Sodium ammonium phosphate.
„ (Glauber's)	Sodium sulphate.
„ (marine)..	Sodium chloride.
„ (marine, argillaceous) ..	Aluminium chloride.
„ (microcosmic)	Sodium ammonium phosphate.
„ (nitrous ammoniacal) ..	Ammonium nitrate.
„ of amber..	Succinic acid.
„ of benzoin	Benzoic acid.
„ of canal	Magnesium sulphate.
„ of colcothar	Ferrosum sulphate.
„ of egra	Magnesium sulphate.
„ of lemons (essential) ..	Potassium hydrogen oxalate.
„ of saturn	Lead acetate.
„ of sedlitz	Magnesium sulphate.
„ of seignette	Sodium potassium tartrate.
„ of soda	Sodium carbonate.
„ of sorrel	Potassium hydrogen oxalate.
„ of tartar	Potassium carbonate.
„ of vitriol..	Zinc sulphate.
„ of wisdom	Ammonio-mercury chloride.
„ (perlate)..	Disodium phosphate.
„ (polychrest) of Glaser ..	Potassium sulphate.
„ (sedative)	Boric acid.
„ (spirit of)	Hydrochloric acid.
„ (sulphureous) of Stahl..	Potassium sulphite.
„ (wonderful)	Sodium sulphate.
„ (wonderful, perlate) ..	Disodium phosphate.

GLOSSARY OF THE MOST IMPORTANT MINERALS, GIVING THE FORMULÆ, HARDNESS, SPECIFIC GRAVITY, AND BEHAVIOUR WITH ACIDS.

I = insoluble in or unaffected by acids; S = soluble in or decomposed by acids.

Formula.	Name.	Hard-ness.	Specific Gravity.	Crystalline System.
$Al_2O_3.3SiO_2+Na_2O.3SiO_2$	I Albite	6	2·6–2·67	Triclin.
$RO.R_2O_3.4SO_3.24H_2O$	S Alum	2–2·5	1·75–1·9	Tess.
$C_{10}H_8O$	S Amber	2–2·5	1·0–1·1	Irreg.
$Al_2O_3.3SiO_2+Na_2O.SiO_2+2H_2O$	S Analcime.. ..	5·5	2·1–2·25	Tess.
$Al_2O_3.SiO_2$	I Andalusite ..	7–7·5	3·1–3·2	Rhomb.
$PbO.SO_3$	S Anglesite.. ..	3	6·2–6·35	Rhomb.
$CaO.SO_3$	I Anhydrite ..	3–3·5	2·8–3·0	Rhomb.
$Al_2O_3.SiO_2+CaO.SiO_2$	S Anorthite.. ..	6	2·7–2·76	Triclin.
C, H, N, O, &c.	— Anthracite ..	2–2·5	1·4–1·7	Irreg.
Ag_2S	S Argentite.. ..	2–2·5	7·0–7·4	Tess.
$CaO.CO_2$	S Arragonite ..	3·5–4·0	2·9–3·0	Rhomb.
C, H, N, O, &c.	— Asphaltum ..	2	1·1–1·2	Irreg.
$(Ca.Mg.Fe)O.SiO_2$	I Augite	5–6	3·0–3·5	Monoclin.
$(Al.B)_2O_3+2(Ca.Fe)O.SiO_2$	I Axinite	6·5–7	3·2–3·3	Triclin.
$3CuO.2CO_2+H_2O$	S Azurite	3·5–4·2	3·7–3·8	Monoclin.
$BaO.SO_3$	I Barytes	3–3·5	4·3–4·7	Rhomb.
$Al_2O_3.3SiO_2+3(GlO.SiO_2)$	I Beryl..	7·5–8	2·6–2·8	Hexag.
$Al_2O_3.SiO_2+3(Mg.K_2.Fe)O.SiO_2$	S Biotite	2·5–3	2·85–2·9	Hexag.
CH_2	— Bitumen		·7–·9	Liquid.
$Na_2O.2B_2O_3+10H_2O$	S Borax	2–2·5	1·7–1·8	Monoclin.

GLOSSARY OF THE MOST IMPORTANT MINERALS—*continued.*

I = insoluble in or unaffected by acids; S = soluble in or decomposed by acids.

Formula.	Name.	Hardness.	Specific Gravity.	Crystalline System.
$3Cu_2S.Fe_2S_3$	S Bornite	3	4·9–5·1	Tess.
C, H, N, O, &c.	— Brown coal ..		·5–1·5	Irreg.
$2Al_2O_3.P_2O_5+5H_2O$	S Calaite	6	2·6–2·8	Irreg.
$CaO.CO_3$	S Calcite	3	2·6–2·8	Hexag., Rhombo.
SnO_2	I Cassiterite ..	6–7	6·8–7·0	Tetrag.
$SrO.SO_3$	I Celestine	3–3·5	3·9–4·0	Rhomb.
$PbO.CO_2$	S Cerussite	3–3·5	6·4–6·6	Rhomb.
$2(2RO.SiO_2)+Al_2O_3.3H_2O$	S Chlorite	1–1·5	2·78–2·96	Hexag.
$(Fe.Mg)O.(Cr.Al)_2O_3$	I Chromite	5·5	4·4–4·5	Tesseral.
$2(Mg.Fe)O.SiO_2$	S Chrysolite ..	6·5–7	3·3–3·5	Rhombic.
K_2O, Al_2O_3, H_2O, Fe_2O_3, CaO, SiO_2, &c.	— Clay		1·8–2·7	Irreg.
CoS_2+CoAs	S Cobaltine	5·5	6·0–6·3	Tess.
$2Al_2O_3.3SiO_2+2(MgO.SiO_2)$	I Cordierite	7–7·5	2·5–2·7	Rhomb.
Al_2O3	I Corundum ..	9	3·9–4·2	Hex., Rhombo.
Cu_2O	S Cuprite	3·5–4	5·7–6·0	Tess.
$Al_2O_3.SiO_2$	I Cyanite	5–7	3·5–3·7	Triclin.
$CuO.SO_3+5H_2O$	S Cyanose	2·5	2·2–2·3	Triclin.
$CaAO.B_2O_3+CaO.2SiO_2+H_2O$	S Datholite	5–5·5	2·9–3·0	Monoclin.
C	I Diamond	10	3·5–3·6	Tess.
$CaO.CO_2+MgO.CO_2$	S Dolomite	3·5–4·5	2·85–2·95	Hex., Rhombo.

GLOSSARY OF THE MOST IMPORTANT MINERALS—*continued.*

I = insoluble in or unaffected by acids; S = soluble in or decomposed by acids.

Formula.	Name.	Hardness.	Specific Gravity.	Crystalline System.
$Al_2O_3.3SiO_2+3(GlO.SiO_2)$	I Emerald	7·5–8·0	2·6–2·8	Hexag.
$MgO(FeO).SiO_2$	I Enstatite	4·5–5·5	3·1–3·3	Rhomb.
$3(Al_2O_3.SiO_2+CaO.SiO_2)+CaO.H_2O$	S Epidote	6–7	3·2–3·5	Monoclin.
$3CoO.As_2O_3+8H_2O$	S Erythrine.. ..	1·5–2·5	2·9–3·0	Monoclin.
CaF_2	S Fluorite	4	3·1–3·2	Tess.
Al_2O_3, (Fe, Mg, Ca, H,)O, SiO_2, &c.	— Fullers' earth ..	1–1·5	1·8–2·0	Irreg.
PbS	S Galena	2·5	7·2–7·6	Tess.
$2ZnO.SiO_2+H_2O$	S Galmei	5	3·3–3·5	Rhomb.
$3(Mg.Ca)O.2SiO_2+(Al.Fe)_2O_3.SiO_2$	S Garnet	6·5–7·5	3·5–4·3	Tess.
$ZnO.SO_3+7H_2O$	S Goslarite	2–2·5	2–2·1	Rhomb.
$Fe_2O_3.H_2O$	S Götheite	5–5·5	3·8–4·4	Rhomb.
C	I Graphite	·5–1	1·9–2·2	Hexag. or Monocl.
$BaO.Al_2O_3+5(H_2O.SiO_2)$	S Harmotome ..	4·5	2·3–2·5	Rhomb.
$2(Al_2O_3.SiO_2+Na_2O.SiO_2)+CaO.SO_3$	S Hauyne	5–5·5	2·4–2·5	Tess.
$Al_2O_3.3SiO_2+CaO.3SiO_2+5H_2O$	S Heulandite ..	3·5–4	2·1–2·2	Monoclin.
$(Mg.Fe, Ca)O.SiO_2$	I Hornblende ..	5–6	2·9–3·4	Monoclin.
$6(2RO.SiO_2)+2Al_2O_3.3SiO_2$	S Idocrase	6·5	3·35–3·45	Tetrag.
$FeO.TiO_2+xFe_2O_3$	S Ilmenite	5–6	4·3–5·0	Hex., Rhombo.

GLOSSARY OF THE MOST IMPORTANT MINERALS—*continued.*

I = insoluble in or unaffected by acids; S = soluble in or decomposed by acids.

Formula.	Name.	Hardness.	Specific Gravity.	Crystalline System.
$H_2O.Al_2O_3+H_2O.2SiO_2$	S Kaolin	1	2·2	Irreg.
$Al_2O_3.2SiO_2+RO.SiO_2$	S Labradorite ..	6	2·6–2·74	Triclin.
SiO_2, SO_3, CaO, Al_2O_3, Na_2O, &c.	S Lapis-lazuli ..	5·5	2·3–2·42	Tess.
$Al_2O_3.SiO_2+Li_2O.SiO_2$	S Lepidolite.. ..	2–3	2·5–3·0	Monocl., Rhomb.
$Al_2O_3.3SiO_2+K_2O.SiO_2$	S Leucite	5·5–6	2·4–2·5	Tess.
$FeAs_2$	S Leucopyrite ..	5–5·5	7·0–7·4	Rhomb.
$Fe_2O_3.SiO_2+3(2RO.SiO_2)+H_2O$	S Lievrite	5·5–6	3·9–4·2	Rhomb.
$FeO.Fe_2O_3$	S Magnetite ..	5·5–6·5	4·9–5·2	Tess.
$(CuO.H_2O+CuO.CO_2)$	S Malachite.. ..	3·5–4	3·6–4·0	Monoclin.
$FeO.SO_3+7H_2O$	S Melanterite ..	2	1·8–1·9	Monoclin.
$3(3PbO.As_2O_5)+PbCl_2$	S Mimetesite ..	3·5–4·0	7·19–7·25	Hexag.
FeS_2+FeAs_2	S Mispickel.. ..	5·5–6·0	6·0–6·2	Rhomb.
MoS	S Molybdenite ..	1–1·5	4·6–4·9	Hexag.
$Al_2O_3.SiO_2+K_2O.SiO_2$	I Muscovite ..	2–3	2·8–3·1	Rhomb.
$Al_2O_3.2SiO_2+Na_2O.SiO_2+2H_2O$	S Natrolite.. ..	5–5·5	2·17–2·26	Rhomb.
$Na_2O.CO_2+10H_2O$	S Natron	1–1·5	1·4–1·5	Monoclin.
$Al_2O_3.2SiO_2+RO.SiO_2$	S Nepheline ..	5·5–6	2·58–2·64	Hexag.
$K_2O.N_2O_5$	S Nitre	2	1·9–2·0	Rhomb.
Al_2O_3, MgO, K_2O, Na_2O, SiO_2, &c.	I Obsidian	6–7	2·2–2·6	Irreg.
$2(Al_2O_3.3SiO_2)+2(Na_2O.CaO).3SiO_2$	I Oligoclase.. ..	6	2·64–2·68	Triclin.

GLOSSARY OF THE MOST IMPORTANT MINERALS—*continued.*

I = insoluble in or unaffected by acids; S = soluble in or decomposed by acids.

Formula.	Name.	Hardness.	Specific Gravity.	Crystalline System.
$4CuO.As_2O_5+H_2O$	S Olivenite	3	4·1–4·6	Rhomb.
$SiO_2.3H_2O$	I Opal	5·5–6·5	2–2·2	Irreg.
$Al_2O_3.3SiO_2+K_2O.3SiO_2$	I Orthoclase ..	6	2·53–2·58	Monoclin.
Al_2O_3, $(Ca.Fe.Mg.Na_2)O$, Fe_2O_3, SiO_2, &c.	I Pitchstone ..	5·5–6·0	2·2–2·3	Irreg.
$Al_2O_3.SiO_2+2(CaO.SiO_2)+H_2O$	S Prehnite	6–7	2·8–3·0	Rhomb.
$3Ag_2S.As_2S_3$	S Proustite		5·5–5·6	Rhombo.
Al_2O_3, MgO, K_2O, Na_2O, SiO_2, &c.	I Pumice	5	2·2	Irreg.
FeS_2	S Pyrites	6–6·5	4·9–5·2	Tess.
$3(3PbO.P_2O_5)+PbCl_2$	S Pyromorphite ..	3·5–4·0	6·9–7·0	Hexag.
$5FeS.Fe_2S_3$	S Pyrrhotine ..	3·5–4·5	4·5–4·6	Hexag.
SiO_2	I Quartz	7	2·5–2·8	Hexag.
AsS	S Realgar	1·5–2	3·4–3·6	Monoclin.
TiO_2	I Rutile	6–6·5	4·2–4·3	Tetrag.
NH_4Cl	S Sal-ammoniac ..	1·5–2	1·5–1·6	Tess.
$B_2O_3+3H_2O$	S Sassoline	1	1·4–1·5	Triclin.
$CaO.WO_3$	S Scheelite	4–4·5	5·9–6·2	Tetrag.
$Al_2O_3.2SiO_2+CaO.SiO_2+3H_2O$	S Scolezite	5–5·5	2·2–2·3	Monoclin.
$3MgO.2SiO_2+2H_2O$	S Serpentine ..	3–3·5	2·5–2·7	
$FeO.CO_2$	S Siderite	3·5–4·5	3·7–3·9	Hex., Rhombo.
$CoAs_2$	S Smaltine	5·5	6·4–7·3	Tess.

GLOSSARY OF THE MOST IMPORTANT MINERALS—*continued.*

I = insoluble in or unaffected by acids; S = soluble in or decomposed by acids.

Formula.	Name.	Hardness.	Specific Gravity.	Crystalline System.
$ZnO.CO_2$	S Smithsonite ..	5	3·3–3·5	Rhomb.
ZnS	S Sphalerite.. ..	3·5–4	3·9–4·2	Tess. and Tetra.
$CaO.2SiO_2+CaO.2TiO_2$	S Sphene	5–5·5	3·4–3·6	Monoclin.
$MgO.Al_2O_3$	I Spinel	8	3·4–4·1	Tess.
$(Al.Fe)_2O_3.SiO_2+(Fe.Mg)O.SiO_2$	S Staurolite	7	3·5–3·8	Rhomb.
$Al_2O_3.3SiO_2+CaO.3SiO_2+6H_2O$	S Stilbite	3·5–4	2·1–2·2	Rhomb.
$SrO.CO_2$	S Strontianite ..	3·5	3·6–3·8	Rhomb.
S	S Sulphur	1·5–2·5	1·9–2·1	Rhomb.
$3(MgO.SiO_2)+H_2O.SiO_2$	I Talc	1	2·6–2·8	Rhomb. or Monocl.
$4(Cu_2.Ag, Fe, Zn, Hg)S.Sb_2S_3$	S Tetrahedrite ..	3–4	4·5–5·2	Tess. and Tetrahed.
$Na_2O.SO_3$	S Thenardite ..	2·5	2·6–2·7	Rhomb.
$RAl_2S_2O_8+5H_2O$	S Thomsonite ..	5–5·5	2·3–2·4	Rhomb.
$5(Al_2O_3.SiO_2)+Al_2F_6.SiF_4$	I Topaz	8	3·4–3·6	Rhomb.
B_2O_3, MgO, CaO, $(Na.K)_2O$, SiO_2, &c.	I Tourmaline ..	6·5–7·5	3–3·3	Rhombo.
$3FeO.P_2O_5+8H_2O$	S Vivianite	2	2·6–2·7	Monoclin.
$Mn(Ca.Ba.K_2)O.Mn_2O_3+3H_2O$	S Wad	3	2·3–3·7	Irreg.
$3Al_2O_3.2P_2O_5+12H_2O$	S Wavellite.. ..	3·5–4	2·3–2·5	Rhomb.
$BaO.CO_2$	S Witherite.. ..	3–3·5	4·2–4·3	Rhomb.
$FeO.MnO.WO_3$	S Wolfram	5–5·5	7·1–7·5	Monoclin.

ASSAY TABLE FOR LEAD ORES.

400 grains of Ore give Grains of Metal.	Weight of Metal in a Ton of Ore.			400 grains of Ore give Grains of Metal.	Weight of Metal in a Ton of Ore.			400 grains of Ore give Grains of Metal.	Weight of Metal in a Ton of Ore.			400 grains of Ore give Grains of Metal.	Weight of Metal in a Ton of Ore.		
	cwts.	qrs.	lbs.		cwts.	qrs.	lbs.		cwts.	qrs.	lbs.		cwts.	qrs.	lbs.
60	3	0	0	93	4	2	16	126	6	1	5	159	7	3	22
61	3	0	5	94	4	2	22	127	6	1	11	160	8	0	0
62	3	0	11	95	4	3	0	128	6	1	16	161	8	0	5
63	3	0	16	96	4	3	5	129	6	1	22	162	8	0	11
64	3	0	22	97	4	3	11	130	6	2	0	163	8	0	16
65	3	1	0	98	4	3	16	131	6	2	5	164	8	0	22
66	3	1	5	99	4	3	22	132	6	2	11	165	8	1	0
67	3	1	11	100	5	0	0	133	6	2	16	166	8	1	5
68	3	1	16	101	5	0	5	134	6	2	22	167	8	1	11
69	3	1	22	102	5	0	11	135	6	3	0	168	8	1	16
70	3	2	0	103	5	0	16	136	6	3	5	169	8	1	22
71	3	2	5	104	5	0	22	137	6	3	11	170	8	2	0
72	3	2	11	105	5	1	0	138	6	3	16	171	8	2	5
73	3	2	16	106	5	1	5	139	6	3	22	172	8	2	11
74	3	2	22	107	5	1	11	140	7	0	0	173	8	2	16
75	3	3	0	108	5	1	16	141	7	0	5	174	8	2	22
76	3	3	5	109	5	1	22	142	7	0	11	175	8	3	0
77	3	3	11	110	5	2	0	143	7	0	16	176	8	3	5
78	3	3	16	111	5	2	5	144	7	0	22	177	8	3	11
79	3	3	22	112	5	2	11	145	7	1	0	178	8	3	16
80	4	0	0	113	5	2	16	146	7	1	5	179	8	3	22
81	4	0	5	114	5	2	22	147	7	1	11	180	9	0	0
82	4	0	11	115	5	3	0	148	7	1	16	181	9	0	5
83	4	0	16	116	5	3	5	149	7	1	22	182	9	0	11
84	4	0	22	117	5	3	11	150	7	2	0	183	9	0	16
85	4	1	0	118	5	3	16	151	7	2	5	184	9	0	22
86	4	1	5	119	5	3	22	152	7	2	11	185	9	1	0
87	4	1	11	120	6	0	0	153	7	2	16	186	9	1	5
88	4	1	16	121	6	0	5	154	7	2	22	187	9	1	11
89	4	1	22	122	6	0	11	155	7	3	0	188	9	1	16
90	4	2	0	123	6	0	16	156	7	3	5	189	9	1	22
91	4	2	5	124	6	0	22	157	7	3	11	190	9	2	0
92	4	2	11	125	6	1	0	158	7	3	16	191	9	2	5

ASSAY TABLE FOR LEAD ORES—*continued.*

400 grains of Ore give Grains of Metal.	Weight of Metal in a Ton of Ore.			400 grains of Ore give Grains of Metal.	Weight of Metal in a Ton of Ore.			400 grains of Ore give Grains of Metal.	Weight of Metal in a Ton of Ore.			400 grains of Ore give Grains of Metal.	Weight of Metal in a Ton of Ore.		
	cwts.	qrs.	lbs.		cwts.	qrs.	lbs.		cwts.	qrs.	lbs.		cwts.	qrs.	lbs.
192	9	2	11	225	11	1	0	258	12	3	16	291	14	2	5
193	9	2	16	226	11	1	5	259	12	3	22	292	14	2	11
194	9	2	22	227	11	1	11	260	13	0	0	293	14	2	16
195	9	3	0	228	11	1	16	261	13	0	5	294	14	2	22
196	9	3	5	229	11	1	22	262	13	0	11	295	14	3	0
197	9	3	11	230	11	2	0	263	13	0	16	296	14	3	5
198	9	3	16	231	11	2	5	264	13	0	22	297	14	3	11
199	9	3	22	232	11	2	11	265	13	1	0	298	14	3	16
200	10	0	0	233	11	2	16	266	13	1	5	299	14	3	22
201	10	0	5	234	11	2	22	267	13	1	11	300	15	0	0
202	10	0	11	235	11	3	0	268	13	1	16	301	15	0	5
203	10	0	16	236	11	3	5	269	13	1	22	302	15	0	11
204	10	0	22	237	11	3	11	270	13	2	0	303	15	0	16
205	10	1	0	238	11	3	16	271	13	2	5	304	15	0	22
206	10	1	5	239	11	3	22	272	13	2	11	305	15	1	0
207	10	1	11	240	12	0	0	273	13	2	16	306	15	1	5
208	10	1	16	241	12	0	5	274	13	2	22	307	15	1	11
209	10	1	22	242	12	0	11	275	13	3	0	308	15	1	16
210	10	2	0	243	12	0	16	276	13	3	5	309	15	1	22
211	10	2	5	244	12	0	22	277	13	3	11	310	15	2	0
212	10	2	11	245	12	1	0	278	13	3	16	311	5	2	5
213	10	2	16	246	12	1	5	279	13	3	22	312	15	2	11
214	10	2	22	247	12	1	11	280	14	0	0	313	15	2	16
215	10	3	0	248	12	1	16	281	14	0	5	314	15	2	22
216	10	3	5	249	12	1	22	282	14	0	11	315	15	3	0
217	10	3	11	250	12	2	0	283	14	0	16	316	15	3	5
218	10	3	16	251	12	2	5	284	14	0	22	317	15	3	11
219	10	3	22	252	12	2	11	285	14	1	0	318	15	3	16
220	11	0	0	253	12	2	16	286	14	1	5	319	15	3	22
221	11	0	5	254	12	2	22	287	14	1	11	320	16	0	0
222	11	0	11	255	12	3	0	288	14	1	16	321	16	0	5
223	11	0	16	256	12	3	5	289	14	1	22	322	16	0	11
224	11	0	22	257	12	3	11	290	14	2	0	323	16	0	16

TABLE SHOWING THE WEIGHT OF SILVER TO THE TON OF ORE, CORRESPONDING TO THE WEIGHT IN GRAINS OBTAINED FROM 400 GRAINS OF MINERAL.

If 400 grains of Ore give Fine Metal.	1 Ton of Ore will Yield.			If 400 grains of Ore give Fine Metal.	1 Ton of Ore will Yield.		
	oz.	dwts.	grs.		oz.	dwts.	grs.
·001	0	1	15	·200	16	6	16
·002	0	3	6	·300	24	10	0
·003	0	4	21	·400	32	13	8
·004	0	6	12	·500	40	16	16
·005	0	8	4	·600	49	0	0
·006	0	9	19	·700	57	3	8
·007	0	11	10	·800	65	6	16
·008	0	13	1	·900	73	10	0
·009	0	14	16	1·000	81	13	8
·010	0	16	8	2·000	163	6	16
·020	1	12	16	3·000	245	0	0
·030	2	9	0	4·000	326	13	8
·040	3	5	8	5·000	408	6	16
·050	4	1	16	6·000	490	0	0
·060	4	18	0	7·000	571	13	8
·070	5	14	8	8·000	653	6	16
·080	6	10	16	9·000	735	0	0
·090	7	7	0	10·000	816	13	8
·100	8	3	8				

WEIGHT OF SILVER TO THE TON OF LEAD ORE CORRESPONDING TO THE WEIGHT IN GRAINS OBTAINED FROM AN ASSAY ON 1 OZ. OF MINERAL.

Grs.	Oz.	Dwts.	Grains.	Grs.	Oz.	Dwts.	Grains.
·001	..	1	11·840	·600	44	16	0·000
·002	..	2	23·680	·700	52	5	8·000
·003	..	4	11·520	·800	59	14	16·000
·004	..	5	23·360	·900	67	4	0·000
·005	..	7	11·200	1·000	74	13	8·000
·006	..	8	23·040	2·000	149	6	16·000
·007	..	10	10·880	3·000	224	0	0·000
·008	..	11	22·720	4·000	298	13	8·000
·009	..	13	10·560	5·000	373	6	16·000
·010	..	14	22·400	6·000	448	0	0·000
·020	1	9	20·800	7·000	522	13	8·000
·030	2	4	19·200	8·000	597	6	16·000
·040	2	19	17·600	9·000	672	0	0·000
·050	3	14	16·000	10 000	746	13	8·000
·060	4	9	14·400	20·000	1493	6	16·000
·070	5	4	12·800	30·000	2240	0	0·000
·080	5	19	11·200	40·000	2986	13	8·000
·090	6	14	9·600	50·000	3733	6	16·000
·100	7	9	8·000	60·000	4480	0	0·000
·200	14	18	16·000	70·000	5226	13	8·000
·300	22	8	0·000	80·000	5973	6	16·000
·400	29	17	8·000	90·000	6720	0	0·000
·500	37	6	16·000	100·000	7466	13	8·000

Table for the Conversion of Carats into Equivalents.

Carats.	Decimal Equivalent.
1	41·667
2	88·333
3	125·000
4	166·667
5	208·333
6	250·000
7	291·667
8	333·333
9	375·000
10	416·667
11	458·222
12	500·000
13	541·667
14	583·333
15	625·000
16	666·667
17	708·333
18	750·000
19	791·667
20	833·333
21	875·000
22	916·667
23	958·222
24	1000·000

Carat Grains.	Decimal Equivalent.
1	10·417
2	20·833
3	31·250
4	41·667

Eighths.	Decimal Equivalent.
1	1·302
2	2·604
3	3·906
4	5·208
5	6·510
6	7·812
7	9·115
8	10·417

Excess Grains.	Decimal Equivalent.
1	0·174
2	0·347
3	0·521
4	0·694
5	0·868
6	1·042
7	1·215
7·5	1·302

TABLE SHOWING THE QUANTITY OF LEAD NECESSARY FOR THE CUPELLATION OF ALLOYS OF SILVER AND COPPER.

Silver in Thousandths.	Lead to be added to 1 gram of Alloy.	Silver in Thousandths.	Lead to be added to 1 gram of Alloy.
1000	0·3 gram	500	16 to 17 grams.
950	3 grams	400	
900	7 "	300	
800	10 "	200	
700	12 "	100	
600	14 "		

TABLE SHOWING THE CORRECTIONS TO BE APPLIED IN DETERMINATIONS OF SILVER BY CUPELLATION OF ALLOYS OF SILVER AND COPPER.

True Value.	Value by Cupellation.	Differences.	True Value.	Value by Cupellation.	Differences.
1000	998·97	1·03	600	595·32	4·68
950	947·50	2·50	550	545·32	4·68
900	896·60	4·00	500	495·32	4·68
850	845·85	4·15	400	396·05	3·95
800	795·70	4·30	300	297·40	2·60
750	745·48	4·52	200	197·47	2·53
700	695·25	4·75	100	99·12	·88
650	645·29	4·71			

TABLE SHOWING THE CORRECTIONS TO BE APPLIED IN DETERMINATIONS OF GOLD BY CUPELLATION.

Gold (True Value in Thousandths).	Gold (Value Found).	Differences.	Gold (True Value in Thousandths).	Gold (Value Found).	Differences.
900	900·25	+ ·25	400	399·50	− ·50
800	800·50	·50	300	299·50	·50
700	700·00	·00	200	199·50	·50
600	600·00	·00	100	99·50	·50
500	499·50	− ·50			

TABLE SHOWING THE QUANTITY OF LEAD NECESSARY FOR THE CUPELLATION OF ALLOYS OF GOLD AND COPPER.

Value in Gold in Thousandths.	Quantity of Lead necessary to remove the Copper.	Value in Gold in Thousandths.	Quantity of Lead necessary to remove the Copper.
1000	1 part	500	26 parts
900	10 parts	400	34 "
800	16 "	300	
700	22 "	200	
600	24 "	100	

URE'S TABLE, SHOWING THE PERCENTAGE AMOUNTS OF METHYL ALCOHOL (WOOD SPIRIT) OF SPECIFIC GRAVITY ·8136 IN AQUEOUS SOLUTIONS AT 15·5° C.

Specific Gravity.	Real Spirit per cent.	Over Excise Proof.	Specific Gravity.	Real Spirit per cent.	Over Excise Proof.
·8136	100·00		·9032	68·50	13·10
·8216	98·00	64·10	·9060	67·56	11·40
·8256	96·11	61·10	·9070	66·66	9·30
·8320	94·34	58·00	·9116	65·00	7·10
·8384	92·22	55·50	·9154	63·30	4·20
·8418	90·90	52·50	·9184	61·73	2·10
·8470	89·30	49 70			Under Proof.
·8514	87·72	47·40	·9218	60·24	·60
·8564	86·20	46·60	·9248	58·82	2·50
·8596	84·75	42·20	·9266	57·73	4·00
·8642	83·33	39·90	·9296	56·18	7·00
·8674	82·00	37·10	·9344	53·70	11·00
·8712	80·64	35·00	·9386	51·84	15·30
·8742	79·36	32·70	·9414	50·00	17·80
·8784	78·13	30·00	·9448	47·62	20·80
·8820	77·00	27·90	·9484	46·00	25·10
·8842	75·76	26·00	·9518	43·48	28·80
·8876	74·63	24·30	·9540	41·66	31·90
·8918	73·53	22·20	·9564	40·00	34·20
·8930	72·46	20·60	·9584	38 46	35·60
·8950	71·43	18·30	·9600	37·11	38·10
·8984	70·42	16·16	·9620	35·71	40·60
·9008	69·44	15·30			

DEVILLE'S TABLE, SHOWING THE PERCENTAGE AMOUNTS OF METHYL ALCOHOL (WOOD SPIRIT) IN SOLUTIONS AT 10° C.

Methyl Alcohol.	Specific Gravity.	Methyl Alcohol.	Specific Gravity.
100	·8070	40	·9429
90	·8371	30	·9576
80	·8619	20	·9709
70	·8873	10	·9751
60	·9072	5	·9857
50	·9232		

TABLE SHOWING THE VOLUMES OF ALCOHOL AND WATER REQUIRED TO MAKE 100 VOLUMES.

100 Volumes of Spirit contain at 59° Fahr. (15° C.).		100 Volumes of Spirit contain at 59° Fahr. (15° C.).	
Volume of Alcohol.	Volume of Water.	Volume of Alcohol.	Volume of Water.
100	0·00	45	58·64
95	6·18	40	63·44
90	11·94	35	68·14
85	17·47	30	72·72
80	22·87	25	77·24
75	28·19	20	81·72
70	33·14	15	86·20
65	38·615	10	90·72
60	43·73	5	95·31
55	48·77	0	100·00
50	53·745		

TABLE BY LOWITZ, GIVING THE PER CENT. OF ABSOLUTE ALCOHOL BY WEIGHT, FROM THE SPECIFIC GRAVITY AT 68° FAHR. (20° C.).

Per cent. of Alcohol by Weight.	Specific Gravity at 68°.	Per cent. of Alcohol by Weight.	Specific Gravity at 68°.	Per cent. of Alcohol by Weight.	Specific Gravity at 68°.
100	791	66	877	32	952
99	794	65	880	31	954
98	797	64	882	30	956
97	800	63	885	29	957
96	803	62	887	28	959
95	805	61	889	27	961
94	808	60	892	26	963
93	811	59	894	25	965
92	813	58	896	24	966
91	816	57	899	23	968
90	818	56	901	22	970
89	821	55	903	21	971
88	823	54	905	20	973
87	826	53	907	19	974
86	828	52	909	18	976
85	831	51	912	17	977
84	834	50	914	16	978
83	836	49	917	15	980
82	839	48	919	14	981
81	842	47	921	13	983
80	844	46	923	12	985
79	847	45	925	11	986
78	849	44	927	10	987
77	851	43	930	9	988
76	853	42	932	8	989
75	856	41	934	7	991
74	859	40	936	6	992
73	861	39	938	5	994
72	863	38	940	4	995
71	866	37	942	3	997
70	868	36	944	2	998
69	870	35	946	1	999
68	872	34	948	0	1000
67	875	33	950		

TABLE OF THE PROPORTION BY WEIGHT OF REAL OR ABSOLUTE ALCOHOL CONTAINED IN 100 PARTS OF SPIRITS OF DIFFERENT SPECIFIC GRAVITIES, AT THE TEMPERATURE OF 60° FAHR.

Specific Gravity.	Per Centage of Alcohol.	Specific Gravity.	Per Centage of Alcohol.	Specific Gravity.	Per Centage of Alcohol.
·9991	0·5	·9511	34	·8769	68
·9981	1	·9490	35	·8745	69
·9965	2	·9470	36	·8721	70
·9947	3	·9452	37	·8696	71
·9930	4	·9434	38	·8672	72
·9914	5	·9416	39	·8649	73
·9898	6	·9396	40	·8625	74
·9884	7	·9376	41	·8603	75
·9869	8	·9356	42	·8581	76
·9855	9	·9335	43	·8557	77
·9841	10	·9314	44	·8533	78
·9828	11	·9292	45	·8508	79
·9815	12	·9270	46	·8483	80
·9802	13	·9249	47	·8459	81
·9789	14	·9228	48	·8434	82
·9778	15	·9206	49	·8408	83
·9766	16	·9184	50	·8382	84
·9753	17	·9160	51	·8357	85
·9741	18	·9135	52	·8331	86
·9728	19	·9113	53	·8305	87
·9716	20	·9090	54	·8279	88
·9704	21	·9069	55	·8254	89
·9691	22	·9047	56	·8228	90
·9678	23	·9025	57	·8199	91
·9665	24	·9001	58	·8172	92
·9652	25	·8979	59	·8145	93
·9638	26	·8956	60	·8118	94
·9623	27	·8932	61	·8089	95
·9609	28	·8908	62	·8061	96
·9593	29	·8886	63	·8031	97
·9578	30	·8863	64	·8001	98
·9560	31	·8840	65	·7969	99
·9544	32	·8816	66	·7938	100
·9528	33	·8793	67		

TABLE OF COMPARISON BETWEEN THE PER CENT. OF ALCOHOL BY VOLUME AT 60° FAHR.—TRALLES'—AND PER CENT. BY WEIGHT.

Per cent.		Per cent.	
By Volume.	By Weight.	By Weight.	By Volume.
0	0·	0	0·
5	4·00	5	6·25
10	8·05	10	14·42
15	12·15	15	18·52
20	16·28	20	24·57
25	20·46	25	30·55
30	24·69	30	36·45
35	28·99	35	42·25
40	33·39	40	47·92
45	37·90	45	53·43
50	42·52	50	58·79
55	47·29	55	63·97
60	52·20	60	68·97
65	57·25	65	73·79
70	62·51	70	78·40
75	67·93	75	82·80
80	73·59	80	86·97
85	79·50	85	90·88
90	85·75	90	94·46
95	92·46	95	97·61
100	100·00	100	100·00

Table for the Dilution of Alcohol.

Desired Strength in per cent.	100 volumes of Alcohol of per cent. by vol.								
	90	85	80	75	70	65	60	55	50
	require volumes of water.								
85	6·56								
80	13·79	6·83							
75	21·89	14·48	7·20						
70	31·05	23·14	15·35	7·64					
65	41·53	33·03	24·66	16·37	8·15				
60	53·65	44·48	35·44	26·47	17·58	8·76			
55	67·87	57·90	48·07	38·32	28·63	19·02	9·47		
50	84·71	73·90	63·04	52·43	41·73	31·25	20·47	10·35	
45	105·34	93·30	81·38	69·54	57·78	46·09	34·46	22·90	11·41
40	130·80	117·34	104·01	90·76	77·58	64·48	51·43	38·46	25·55
35	163·28	148·01	132·88	117·82	102·84	87·93	73·08	58·31	43·59
30	206·22	188·57	171·05	153·61	136·04	118·94	101·71	84·54	67·45
25	266·12	245·15	224·30	203·53	182·83	162·21	141·65	121·16	100·73
20	355·80	329·84	304·01	278·26	252·58	226·98	201·43	175·96	150·55
15	505·27	471·00	436·85	402·81	368·83	334·91	301·07	267·29	233·64
10	804·54	753·65	702·89	652·21	601·60	551·06	500·59	450·19	399·85

Correspondence between the Specific Gravities and Per Cents. of Alcohol over and under Proof at 60° Fahr.

Specific Gravity.	Per cent. over Proof.	Specific Gravity.	Per cent. over Proof.	Specific Gravity.	Per cent. over Proof.	Specific Gravity.	Per cent. over Proof.	Specific Gravity.	Per cent. over Proof.
0·8156	67·0	0·8273	61·3	0·8390	55·3	0·8503	48·9	0·8615	42·0
8160	66·8	8277	61·1	8393	55·1	8506	48·7	8618	41·7
8163	66·6	8280	60·9	8396	55·0	8510	48·5	8622	41·5
8167	66·5	8284	60·7	8400	54·8	8513	48·3	8625	41·3
8170	66·3	8287	60·5	8403	54·6	8516	48·0	8629	41·1
8174	66·1	8291	60·4	8407	54·4	8520	47·8	8632	40·9
8178	65·9	8294	60·2	8410	54·2	8523	47·6	8636	40·6
8181	65·8	8298	60·0	8413	54·1	8527	47·4	8639	40·4
8185	65·6	8301	59·8	8417	53·9	8530	47·2	8643	40·2
8188	65·5	8305	59·6	8420	53·7	8533	47·0	8646	40·0
8192	65·3	8308	59·5	8424	53·5	8537	46·8	8650	39·8
8196	65·1	8312	59·3	8427	53·3	8540	46·6	8653	39·6
8199	65·0	8315	59·1	8431	53·1	8543	46·4	8657	39·3
8203	64·8	8319	58·9	8434	52·9	8547	46·2	8660	39·1
8206	64·7	8322	58·7	8438	52·7	8550	46·0	8664	38·9
8210	64·5	8326	58·6	8441	52·5	8553	45·8	8667	38·7
8214	64·3	8329	58·4	8445	52·3	8556	45·6	8671	38·4
8218	64·1	8333	58·2	8448	52·1	8560	45·4	8674	38·2
8221	64·0	8336	58·0	8452	51·9	8563	45·2	8678	38·0
8224	63·8	8340	57·8	8455	51·7	8566	45·0	8681	37·8
8227	63·6	8344	57·7	8459	51·5	8570	44·8	8685	37·6
8231	63·4	8347	57·5	8462	51·3	8573	44·6	8688	37·3
8234	63·2	8351	57·3	8465	51·1	8577	44·4	8692	37·1
8238	63·1	8354	57·1	8469	50·9	8581	44·2	8695	36·9
8242	62·9	8358	56·9	8472	50·7	8583	43·9	8699	36·7
8245	62·7	8362	56·8	8476	50·5	8587	43·7	8702	36·4
8249	62·5	8365	56·6	8480	50·3	8590	43·5	8706	36·2
8252	62·3	8369	56·4	8482	50·1	8594	43·3	8709	35·9
8256	62·2	8372	56·2	8486	49·9	8597	43·1	8713	35·7
8259	62·0	8376	56·0	8490	49·7	8601	42·8	8716	35·5
8263	61·8	8379	55·9	8493	49·5	8604	42·6	8720	35·2
8266	61·6	8383	55·7	8496	49·3	8608	42·4	8723	35·0
8270	61·4	8386	55·5	8499	49·1	8611	42·2	8727	34·7

CORRESPONDENCE BETWEEN THE SPECIFIC GRAVITIES, &c.—*continued.*

Specific Gravity.	Per cent. over Proof.	Specific Gravity.	Per cent. over Proof.	Specific Gravity.	Per cent. over Proof.	Specific Gravity.	Per cent. over Proof.	Specific Gravity.	Per cent. under Proof.
0·8730	34·5	0·8850	26·3	0·8974	17·5	0·9100	8·0	0·9222	1·9
8734	34·3	8854	26·0	8977	17·2	9104	7·7	9226	2·2
8737	34·1	8858	25·8	8981	16·9	9107	7·4	9229	2·5
8741	33·8	8861	25·5	8985	16·6	9111	7·1	9233	2·8
8744	33·6	8865	25·3	8989	16·4	9115	6·8	9237	3·1
8748	33·4	8869	25·0	8992	16·1	9118	6·5	9241	3·4
8751	33·2	8872	24·8	8996	15·9	9122	6·2	9244	3·7
8755	32·9	8876	24·5	9000	15·6	9126	5·9	9248	4·0
8758	32·7	8879	24·3	9004	15·3	9130	5·6	9252	4·4
8762	32·4	8883	24·0	9008	15·0	9134	5·3	9255	4·7
8765	32·2	8886	23·8	9011	14·8	9137	5·0	9259	5·0
8769	32·0	8890	23·5	9015	14·5	9141	4·8	9263	5·3
8772	31·7	8894	23·2	9019	14·2	9145	4·5	9267	5·7
8776	31·5	8897	23·0	9023	13·9	9148	4·2	9270	6·0
8779	31·2	8901	22·7	9026	13·6	9152	3·9	9274	6·4
8783	31·0	8904	22·5	9030	13·4	9156	3·6	9278	6·7
8786	30·8	8908	22·2	9034	13·1	9159	3·3	9282	7·0
8790	30·5	8912	21·9	9038	12·8	9163	3·0	9286	7·3
8793	30·3	8915	21·7	9041	12·5	9167	2·7	9291	7·7
8797	30·0	8919	21·4	9045	12·2	9170	2·4	9295	8·0
8800	29·8	8922	21·2	9049	12·0	9174	2·1	9299	8·3
8804	29·5	8926	20·9	9052	11·7	9178	1·9	9302	8·6
8807	29·3	8930	20·6	9056	11·4	9182	1·6	9306	9·0
8811	29·0	8933	20·4	9060	11·1	9185	1·3	9310	9·3
8814	28·8	8937	20·1	9064	10·8	9189	1·0	9314	9·7
8818	28·5	8940	19·9	9067	10·6	9192	0·7	9318	10·0
8822	28·3	8944	19·6	9071	10·3	9196	0·3	9322	10·3
8825	28·0	8948	19·3	9075	10·0	9200	Proof	9326	10·7
8829	27·8	8951	19·1	9079	9·7	Under Proof		9329	11·0
8832	27·5	8955	18·8	9082	9·4	9204	0·3	9332	11·4
8836	27·3	8959	18·6	9085	9·2	9207	0·6	9337	11·7
8840	27·0	8962	18·3	9089	8·9	9210	0·9	9341	12·1
8843	26·8	8966	18·0	9093	8·6	9214	1·3	9345	12·4
8847	26·5	8970	17·7	9097	8·3	9218	1·6	9349	12·8

CORRESPONDENCE BETWEEN THE SPECIFIC GRAVITIES, &c.—*continued.*

Specific Gravity.	Per cent. under Proof.	Specific Gravity.	Per cent. under Proof.	Specific Gravity.	Per cent. under Proof.	Specific Gravity.	Per cent. under Proof.	Specific Gravity.	Per cent. under Proof.
0·9353	13·1	0·9484	25·9	0·9611	41·1	0·9742	61·8	0·9874	83·5
9357	13·5	9488	26·3	9615	41·7	9746	62·5	9878	84·0
9360	13·9	9492	26·7	9619	42·2	9750	63·2	9882	84·6
9364	14·2	9496	27·1	9623	42·8	9754	63·9	9886	85·2
9368	14·6	9499	27·5	9627	43·3	9758	64·6	9890	85·8
9372	14·9	9503	28·0	9631	43·9	9762	65·3	9894	86·3
9376	15·3	9507	28·4	9635	44·4	9766	66·0	9898	86·9
9380	15·7	9511	28·8	9638	45·0	9770	66·7	9902	87·4
9384	16·0	9515	29·2	9642	45·5	9774	67·4	9906	88·0
9388	16·4	9519	29·7	9646	46·1	9778	68·0	9910	88·5
9392	16·7	9522	30·1	9650	46·7	9782	68·7	9914	89·1
9396	17·1	9526	30·6	9654	47·3	9786	69·4	9918	89·6
9399	17·5	9530	31·1	9657	47·9	9790	70·1	9922	90·2
9403	17·8	9534	31·4	9661	48·5	9794	70·8	9926	90·7
9407	18·2	9539	31·9	9665	49·1	9798	71·4	9930	91·2
9411	18·5	9542	32·3	9669	49·7	9802	72·1	9934	91·7
9415	18·9	9546	32·8	9674	50·3	9806	72·8	9938	92·3
9419	19·3	9550	33·2	9677	51·0	9810	73·5	9942	92·8
9422	19·7	9553	33·7	9681	51·6	9814	74·1	9946	93·3
9426	20·0	9557	34·2	9685	52·2	9818	74·8	9950	93·8
9430	20·4	9561	34·7	9689	52·9	9822	75·4	9954	94·3
9434	20·8	9565	35·1	9693	53·3	9826	76·1	9958	94·9
9437	21·2	9569	35·6	9697	54·2	9830	76·7	9962	95·4
9441	21·6	9573	36·1	9701	54·8	9834	77·3	9966	95·9
9445	21·9	9577	36·6	9705	55·5	9838	78·0	9970	96·4
9448	22·2	9580	37·1	9709	56·2	9842	78·6	9974	96·8
9452	22·7	9584	37·6	9713	56·9	9846	79·2	9978	97·3
9456	23·1	9588	38·1	9718	57·6	9850	79·8	9982	97·7
9460	23·5	9592	38·6	9722	58·3	9854	80·4	9986	98·2
9464	23·9	9596	39·1	9726	59·0	9858	81·1	9990	98·7
9468	24·3	9599	39·6	9730	59·7	9862	81·7	9993	99·1
9472	24·7	9603	40·1	9734	60·4	9866	82·3	9997	99·6
9476	25·1	9607	40·6	9738	61·1	9870	82·9	1·0000	100·0
9480	25·5								

Table showing the Boiling Points of Mixtures of Alcohol and Water.

Temp. of Vapour °C.	Alcohol per cent. by vol. in the Boiling Liquid.	Alcohol per cent. by vol. in the Distillate.	Temp. of Vapour °C.	Alcohol per cent. by vol. in the Boiling Liquid.	Alcohol per cent. by vol. in the Distillate.
77·2	92	93	87·5	20	71
77·5	90	92	88·7	18	68
77·8	85	91·5	90·0	15	66
78·2	80	90·5	91·2	12	61
78·7	75	90	92·5	10	55
79·4	70	89	93·7	7	50
80·0	65	87	95·0	5	42
81·2	50	85	96·2	3	36
82·5	40	82	97·5	2	18
83·7	35	80	98·7	1	13
85·0	30	78	100·0	0	—
86·2	25	76			

Tralles' Table I. gives the strength of mixtures of alcohol and water at 60° F., water at its maximum density being taken as 1.

Tralles' Table II. gives the necessary data for obtaining the percentage of alcohol when the temperature at the time of experiment is above or below 60° F.

Tralles' Table III. gives the densities as given by a glass instrument between 30° and 85°, while Table IV. gives the corrections by means of which the readings of Table III. can be made to correspond with the readings of a brass instrument.

Tralles' Table V. gives the percentage of absolute alcohol by volume, reference being had to the volume of the liquid at the temperature of the experiment. Table VI. gives the corrections to reduce the readings of Table V. to those of a brass instrument.

Tralles' Table VII. is for use with Tralles' alcoholometer; it is graduated for 60° F.

TRALLES' TABLE I.

Per cent. of Alcohol, by Volume.	Specific Gravity of the Liquid at 60° F.	Difference of the Specific Gravities.	Per cent. of Alcohol, by Volume.	Specific Gravity of the Liquid at 60° F.	Difference of the Specific Gravities.	Per cent. of Alcohol, by Volume.	Specific Gravity of the Liquid at 60° F.	Difference of the Specific Gravities.
0	0·9991		34	0·9596	13	68	0·8941	24
1	9976	15	35	9583	13	69	8917	24
2	9961	15	36	9570	13	70	8892	25
3	9947	14	37	9556	14	71	8867	25
4	9933	14	38	9541	15	72	8842	25
5	9919	14	39	9526	15	73	8817	25
6	9906	13	40	9510	16	74	8791	26
7	9893	13	41	9494	16	75	8765	26
8	9881	12	42	9478	16	76	8739	26
9	9869	12	43	9461	17	77	8712	27
10	9857	12	44	9444	17	78	8685	27
11	9845	12	45	9427	17	79	8658	27
12	9834	11	46	9409	18	80	8631	27
13	9823	11	47	9391	18	81	8603	28
14	9812	11	48	9373	18	82	8575	28
15	9802	10	49	9354	19	83	8547	28
16	9791	11	50	9335	19	84	8518	29
17	9781	10	51	9315	20	85	8488	30
18	9771	10	52	9295	20	86	8458	30
19	9761	10	53	9275	20	87	8428	30
20	9751	10	54	9254	21	88	8397	31
21	9741	10	55	9234	20	89	8365	32
22	9731	10	56	9213	21	90	8332	33
23	9720	11	57	9192	21	91	8299	33
24	9710	10	58	9170	22	92	8265	34
25	9700	10	59	9148	22	93	8230	35
26	9689	11	60	9126	22	94	8194	36
27	9679	10	61	9104	22	95	8157	37
28	9668	11	62	9082	22	96	8118	39
29	9657	11	63	9059	23	97	8077	41
30	9646	11	64	9036	23	98	8034	43
31	9634	12	65	9013	23	99	7988	46
32	9622	12	66	8989	24	100	7939	49
33	9609	13	67	8965	24			

TRALLES' TABLE II.

Per cent., by Volume, of absolute Alcohol.	Specific Gravity of the Liquid at 60° F.	Increase of Specific Gravity at the Indicated Temperature *below* 60°.						Decrease of Specific Gravity at the Indicated Temperature *above* 60°.							
		+55°	50°	45°	40°	35°	30°	65°	70°	75°	80°	85°	90°	95°	100°
0	0·9991	4	7	9	9	9	7	1	11	17	24	32	40	50	60
5	9919	4	7	9	10	10	9	1	11	18	25	33	42	51	62
10	9857	5	9	12	14	15	15	6	13	20	29	37	47	57	68
15	9802	6	12	17	21	23	25	7	15	25	34	44	55	67	79
20	9751	8	16	23	29	35	39	9	19	30	41	53	66	79	93
25	9700	10	21	31	39	48	56	11	24	36	50	63	78	93	109
30	9646	13	26	39	51	62	73	14	28	43	59	75	91	108	125
35	9583	16	31	46	61	75	89	17	33	50	68	86	104	122	141
40	9510	18	35	52	70	87	103	18	37	56	75	94	114	136	154
45	9427	19	39	57	76	94	112	20	40	60	80	101	122	143	154
50	9335	20	40	60	80	99	118	21	42	63	84	106	128	150	173
55	9234	21	42	63	84	104	124	22	43	65	87	109	132	155	178
60	9126	22	43	65	86	107	127	22	44	67	90	113	136	159	183
65	9013	22	45	67	88	109	130	22	45	68	92	115	138	162	187
70	8892	22	45	68	90	112	133	23	46	69	93	117	141	165	190
75	8765	23	46	68	91	113	135	23	46	70	94	119	143	167	192
80	8631	23	47	70	92	115	137	23	47	71	96	120	144	169	194
85	8488	23	47	70	93	116	139	24	48	72	96	121	145	170	195
90	8332	24	48	71	94	117	140	24	48	72	97	121	146	171	196

Tralles' Table III.

Per cent. of Alcohol, by Volume.	Specific Gravity of the Liquid, ascertained by Glass Instruments, at the Indicated Temperatures.										
	30°	35°	40°	45°	50°	55°	60°	65°	70°	75°	80°	85°
0	·9994	·9997	·9997	·9998	·9997	·9994	·9991	·9987	·9981	·9976	·9970	·9962
5	9924	9926	9926	9925	9925	9922	9919	9915	9909	9903	9897	9889
10	9868	9869	9868	9867	9865	9861	9857	9852	9845	9839	9831	9823
15	9823	9822	9820	9817	9813	9807	9802	9796	9788	9779	9771	9761
20	9786	9782	9777	9772	9766	9759	9751	9743	9733	9723	9713	9701
25	9752	9745	9737	9729	9720	9709	9700	9690	9678	9666	9653	9640
30	9715	9705	9694	9683	9671	9658	9646	9633	9619	9605	9590	9574
35	9668	9655	9641	9627	9612	9598	9583	9567	9551	9535	9518	9500
40	9609	9594	9577	9560	9544	9527	9510	9493	9474	9456	9438	9419
45	9535	9518	9500	9482	9464	9445	9427	9408	9388	9369	9359	9329
50	9449	9431	9413	9393	9374	9354	9335	9315	9294	9274	9253	9232
55	9354	9335	9316	9295	9275	9254	9234	9213	9192	9171	9150	9128
60	9249	9230	9210	9189	9168	9147	9126	9105	9083	9061	9039	9016
65	9140	9120	9099	9078	9056	9034	9013	8992	8969	8947	8924	8901
70	9021	9001	8980	8958	8936	8913	8892	8870	8847	8825	8801	8778
75	8896	8875	8854	8832	8810	8787	8765	8743	8720	8697	8673	8649
80	8764	8743	8721	8699	8676	8653	8631	8609	8585	8562	8538	8514
85	8623	8601	8579	8556	8533	8510	8488	8465	8441	8418	8394	8370
90	8469	8446	8423	8401	8379	8355	8332	8309	8285	8262	8238	8214

Tralles' Table IV.

To be subtracted.						To be added.					
30°	35°	40°	45°	50°	55°	60°	65°	70°	75°	80°	85°
·0005	·0004	·0003	·0002	·0002	·0001	—	·0001	·0002	·0002	·0003	·0004

TRALLES' TABLE V.

To ascertain at any temperature, from the specific gravity, the quantity of absolute alcohol in a liquid expressed in volume centesimally, at the indicated temperature.

Per cent. of Absolute Alcohol in the Liquid as measured.	Specific Gravity of the Liquid, ascertained by Glass Instruments, at the Indicated Temperatures.											
	30°	35°	40°	45°	50°	55°	60°	65°	70°	75°	80°	85°
0	·9994	·9997	·9997	·9998	·9997	·9994	·9991	·9987	·9981	·9976	·9970	·9962
5	9924	9926	9926	9926	9925	9922	9919	9915	9909	9903	9897	9889
10	9868	9869	9868	9867	9865	9861	9857	9852	9845	9839	9831	9823
15	9823	9822	9820	9817	9813	9807	9802	9796	9788	9779	9771	9761
20	9786	9782	9777	9772	9766	9759	9751	9743	9733	9722	9711	9700
25	9753	9746	9738	9729	9720	9709	9700	9690	9678	9665	9652	9638
30	9717	9707	9695	9684	9672	9659	9646	9632	9618	9603	9588	9572
35	9671	9658	9644	9629	9614	9599	9583	9566	9549	9532	9514	9495
40	9615	9598	9581	9563	9546	9528	9510	9491	9472	9452	9433	9412
45	9544	9525	9506	9486	9467	9447	9427	9406	9385	9364	9342	9320
50	9460	9440	9420	9399	9378	9356	9335	9313	9290	9267	9244	9221
55	9368	9347	9325	9302	9279	9256	9234	9211	9187	9163	9139	9114
60	9267	9245	9222	9198	9174	9150	9126	9102	9076	9051	9026	9000
65	9162	9138	9113	9088	9063	9038	9013	8988	8962	8936	8909	8882
70	9046	9021	8996	8970	8944	8917	8892	8866	8839	8812	8784	8756
75	8925	8890	8873	8847	8820	8792	8765	8738	8710	8681	8652	8622
80	8798	8771	8744	8716	8688	8659	8631	8602	8573	8544	8514	8483
85	8663	8635	8606	8577	8547	8517	8488	8458	8427	8396	8365	8333
90	8517	8486	8455	8425	8395	8363	8332	8300	8268	8236	8204	8171

TRALLES' TABLE VI.

To be added.						To be subtracted.					
30°	35°	40°	45°	50°	55°	60°	65°	70°	75°	80°	85°
·0005	·0004	·0003	·0002	·0002	·0001	—	·0001	·0002	·0002	·0003	·0004.

TRALLES' TABLE VII.

Per cent. of Alcohol, by Volume.	Length of immersed part of Stem.	Distance between Degrees of Scale indicating per cent.	Per cent. of Alcohol, by Volume.	Length of immersed part of Stem.	Distance between Degrees of Scale indicating per cent.	Per cent. of Alcohol, by Volume.	Length of immersed part of Stem.	Distance between Degrees of Scale indicating per cent.
0	9		34	420	13	68	1184	30
1	24	15	35	434	14	69	1215	31
2	39	15	36	449	15	70	1246	31
3	54	15	37	465	16	71	1278	32
4	68	14	38	481	16	72	1310	32
5	82	14	39	498	17	73	1342	32
6	95	13	40	515	17	74	1375	33
7	108	13	41	533	18	75	1409	34
8	121	13	42	551	18	76	1443	34
9	133	12	43	569	18	77	1478	35
10	145	12	44	588	19	78	1514	36
11	157	12	45	608	20	79	1550	36
12	169	12	46	628	20	80	1587	37
13	180	11	47	648	20	81	1624	37
14	191	11	48	669	21	82	1662	38
15	202	11	49	690	21	83	1701	39
16	213	11	50	712	22	84	1740	39
17	224	11	51	735	23	85	1781	41
18	235	11	52	758	23	86	1823	42
19	245	10	53	782	24	87	1866	43
20	356	10	54	806	24	88	1910	44
21	266	10	55	830	24	89	1955	45
22	277	11	56	854	24	90	2002	47
23	288	11	57	879	25	91	2050	48
24	299	11	58	905	26	92	2099	49
25	310	11	59	931	26	93	2150	51
26	321	11	60	957	26	94	2203	53
27	332	11	61	984	27	95	2259	56
28	344	12	62	1011	27	96	2318	59
29	355	11	63	1039	28	97	2380	62
30	367	12	64	1067	28	98	2447	67
31	380	13	65	1096	29	99	2519	72
32	393	13	66	1125	29	100	2597	78
33	407	14	67	1154	29			

TRALLES' TABLE VIII.

To find the true percentage of absolute alcohol by volume, in a liquid at 60° Fahr. from the observed percentage indicated by a glass alcoholometer at any other temperature (degrees Fahr.).

30°	35°	40°	45°	50°	55°	60°	60°	65°	70°	75°	80°	85°
− 0·2	− 0·4	− 0·4	− 0·5	− 0·4	− 0·2	0	0	+ 0·2	+ 0·6	+ 1·0	+ 1·4	+ 1·9
+ 4·6	+ 4·5	+ 4·5	+ 4·5	+ 4·6	+ 4·8	5	5	5·3	5·8	6·2	6·7	7·3
9·1	9·0	9·1	9·2	9·3	9·7	10	10	10·4	11·0	11·6	12·3	13·0
13·0	13·1	13·3	13·5	13·9	14·5	15	15	15·6	16·3	17·1	18·0	19·0
16·5	16·9	17·4	17·8	18·5	19·2	20	20	20·8	21·8	22·8	23·8	24·9
19·9	20·6	21·4	22·2	23·0	24·1	25	25	25·9	27·0	28·2	29·4	30·5
23·5	24·5	25·7	26·6	27·7	28·8	30	30	31·1	32·2	33·4	34·5	35·7
28·0	29·2	30·4	31·6	32·7	33·8	35	35	36·2	37·3	38·4	39·5	40·6
33·0	34·2	35·4	36·7	37·8	39·0	40	40	41·1	42·2	43·3	44·3	45·4
38·4	39·6	40·7	41·8	42·9	43·9	45	45	46·1	47·1	48·2	49·2	50·3
43·7	44·7	45·8	46·9	47·9	49·0	50	50	51·0	52·0	53·0	54·0	55·1
49·0	50·0	51·0	52·0	53·0	54·0	55	55	54·9	56·9	57·9	58·9	59·9
54·2	55·2	56·2	57·1	58·1	59·0	60	60	60·9	61·9	62·9	63·8	64·9
59·4	60·3	61·2	62·2	63·1	64·0	65	65	65·9	66·8	67·7	68·6	69·6
64·6	65·5	66·4	67·3	68·2	69·1	70	70	70·8	71·7	72·6	73·5	74·5
69·8	70·7	71·5	72·4	73·3	74·2	75	75	75·8	76·7	77·6	78·4	79·3
75·0	75·8	76·6	77·5	78·4	79·2	80	80	80·8	81·7	82·4	83·2	84·1
80·3	81·1	81·8	82·6	83·5	84·3	85	85	85·7	86·5	87·3	88·0	88·8
85·6	86·4	87·1	87·9	88·6	89·3	90	90	90·7	91·4	92·0	92·7	93·4

TRALLES' TABLE IX.

To find the true percentage of absolute alcohol by volume, in a liquid of any temperature, from the observed percentage indicated by the glass alcoholometer at the same temperature.

True per cent. of Alcohol, by Volume, at 60° Fahr.	Observed per cent. indicated by the Glass Alcoholometer.										
	30°	35°	40°	45°	50°	55°	65°	70°	75°	80°	85°
0	− 0·2	− 0·4	− 0·4	− 0·5	− 0·4	− 0·2	+ 0·2	+ 0·6	+ 1·0	+ 1·4	+ 1·9
5	+ 4·6	+ 4·5	+ 4·5	+ 4·5	+ 4·6	+ 4·8	5·3	5·8	6·2	6·7	7·3
10	9·1	9·0	9·1	9·2	9·3	9·7	10·4	11·0	11·6	12·3	13·0
15	13·0	13·1	13·3	13·6	14·1	14·5	15·6	16·3	17·1	18·0	19·0
20	16·5	16·9	17·4	17·9	18·5	19·2	20·8	21·8	22·9	23·9	25·0
25	19·8	20·5	21·3	22·2	23·0	24·1	25·9	27·1	28·3	29·5	30·7
30	23·3	24·3	25·5	26·5	27·6	28·8	31·2	32·3	33·5	34·6	35·9
35	27·7	28·9	30·2	31·4	32·6	33·8	36·3	37·5	38·6	39·7	40·9
40	32·5	33·8	35·1	36·5	37·7	38·9	41·2	42·4	43·5	44·6	45·8
45	37·8	39·1	40·3	41·5	42·7	43·8	46·2	47·3	48·5	49·6	50·8
50	43·1	44·2	45·4	46·6	47·7	48·9	51·1	52·2	53·4	54·5	55·6
55	48·3	49·4	50·5	51·6	52·8	53·9	56·1	57·2	58·3	59·4	60·5
60	53·4	54·5	55·6	56·7	57·8	58·9	61·1	62·2	63·3	64·4	65·5
65	58·4	59·5	60·6	61·7	62·8	63·9	66·0	67·1	68·2	69·3	70·4
70	63·5	64·6	65·7	66·8	67·9	69·0	71·0	72·1	73·2	74·3	75·4
75	68·6	69·7	70·7	71·8	72·9	74·0	76·0	77·1	78·2	79·2	80·3
80	73·7	74·8	75·8	76·9	78·0	79·0	81·0	82·1	83·1	84·1	85·2
85	78·8	79·8	80·9	81·9	83·0	84·0	86·0	87·0	88·0	89·0	90·0
90	84·0	85·1	86·1	87·1	88·1	89·1	91·0	91·9	92·8	93·7	94·6

Tralles' Table X.

To find the true percentage of absolute alcohol in a liquid of any temperature, from the observed percentage indicated by a brass alcoholometer at the same temperature.

True per cent. of Alcohol, by Volume.	Observed per cent. indicated by the Brass Alcoholometer.										
	30°	35°	40°	45°	50°	55°	65°	70°	75°	80°	85°
0	− 0·1	− 0·1	− 0·2	− 0·3	− 0·3	− 0·2	+ 0·2	+ 0·5	+ 0·9	+ 1·2	+ 1·7
5	+ 5·0	+ 4·8	+ 4·7	+ 4·8	+ 4·7	+ 4·8	5·2	5·6	6·1	6·5	7·0
10	9·5	9·4	9·4	9·4	9·5	9·7	10·3	10·8	11·4	12·0	12·6
15	13·5	13·5	13·6	13·7	14·0	14·6	15·5	16·2	17·0	17·7	18·6
20	17·0	17·3	17·7	18·1	18·7	19·3	20·7	21·6	22·7	23·7	24·0
25	20·3	20·9	21·6	22·4	23·3	24·2	25·8	26·9	28·1	29·2	30·3
30	23·8	24·7	25·8	26·8	27·8	28·9	31·1	32·2	33·3	34·4	35·5
35	28·2	29·3	30·4	31·6	32·8	33·9	36·2	37·3	38·4	39·5	40·7
40	32·9	34·1	35·4	36·7	37·9	39·0	41·1	42·2	43·4	44·5	45·6
45	38·1	39·3	40·4	41·6	42·7	43·9	46·1	47·2	48·3	49·4	50·5
50	43·4	44·5	45·6	46·7	47·8	48·9	51·1	52·2	53·3	54·4	55·5
55	48·5	49·6	50·7	51·8	52·9	54·0	56·0	57·1	58·2	59·3	60·4
60	53·6	54·6	55·7	56·8	57·8	58·9	61·0	62·1	63·2	64·3	65·3
65	58·6	59·7	60·7	61·8	62·8	63·9	66·0	67·1	68·1	69·2	70·2
70	63·7	64·8	65·8	66·9	67·9	69·0	71·0	72·1	73·1	74·2	75·2
75	68·8	69·8	70·9	71·9	72·9	74·0	76·0	77·0	78·1	79·1	80·1
80	73·9	74·9	75·9	76·9	78·0	79·0	81·0	82·0	83·0	84·0	85·0
85	79·0	80·0	81·0	82·0	83·0	84·0	86·0	87·0	88·0	88·9	89·9
90	84·2	85·2	86·2	87·2	88·1	89·1	90·9	91·9	92·8	93·7	94·5

(GAY-LUSSAC.)—ALCOHOLOMETRIC TABLE I.

To find the percentage by volume in a liquid at 59° from the observed percentage at any other temperature.

(The temperature Centigrade is below that of Fahrenheit.)

Temp. Fahr.	Observed percentage of the Alcoholometer.																			
	1 per cent.	2 per cent.	3 per cent.	4 per cent.	5 per cent.	6 per cent.	7 per cent.	8 per cent.	9 per cent.	10 per cent.	11 per cent.	12 per cent.	13 per cent.	14 per cent.	15 per cent.	16 per cent.	17 per cent.	18 per cent.	19 per cent.	20 per cent.
32·0°	1·3	2·4	3·4	4·4	5·4	6·5	7·5	8·6	9·7	10·9	12·2	13·4	14·7	16·1	17·5	18·9	20·3	21·6	22·9	24·2
0° C.	1000	1000	1000	1000	1000	1001	1001	1001	1001	1001	1001	1002	1002	1002	1002	1003	1003	1004	1004	1004
33·0												13·4	14·7	16	17·3	18·7	20	21·3	22·6	23·9
1 C.												1002	1002	1002	1002	1003	1003	1003	1004	1004
35·6												13·4	14·7	16	17·2	18·5	19·8	21·1	22·3	23·6
2 C.												1002	1002	1002	1002	1003	1003	1003	1004	1004
37·4												13·3	14·6	15·9	17·1	18·3	19·6	20·8	22	23·3
3 C.												1001	1002	1002	1002	1002	1003	1003	1003	1004
39·2												13·3	14·5	15·8	16·9	18·1	19·4	20·6	21·8	23
4 C.												1001	1002	1002	1002	1002	1002	1003	1003	1003
41·0	1·4	2·5	3·5	4·5	5·5	6·6	7·7	8·7	9·8	10·9	12·1	13·2	14·4	15·7	16·8	18	19·2	20·4	21·5	22·7
5 C.	1001	1001	1001	1001	1001	1001	1001	1001	1001	1001	1001	1001	1001	1002	1002	1002	1002	1003	1003	1003
42·8												13·1	14·3	15·6	16·7	17·8	19	20·2	21·3	22·4
6 C.												1001	1001	1002	1002	1002	1002	1003	1003	1003
44·6												13	14·2	15·4	16·6	17·7	18·8	20	21	22·1
7 C.												1001	1001	1001	1002	1002	1002	1002	1002	1002
46·4												13	14·1	15·3	16·4	17·5	18·6	19·7	20·7	21·8
8 C.												1001	1001	1001	1001	1001	1002	1002	1002	1002
48·2												12·9	14	15·1	16·2	17·3	18·4	19·5	20·5	21·6
9 C.												1001	1001	1001	1001	1001	1001	1001	1002	1002

(GAY-LUSSAC.)—TABLE I.—*continued.*

Temp. Fahr.	Observed percentage of the Alcoholometer.																			
	1 per cent.	2 per cent.	3 per cent.	4 per cent.	5 per cent.	6 per cent.	7 per cent.	8 per cent.	9 per cent.	10 per cent.	11 per cent.	12 per cent.	13 per cent.	14 per cent.	15 per cent.	16 per cent.	17 per cent.	18 per cent.	19 per cent.	20 per cent.
50·0°	1·4	2·4	3·4	4·5	5·5	6·5	7·5	8·5	9·5	10·6	11·7	12·7	13·8	14·9	16	17	18·1	19·2	20·2	21·3
10° C.	1000	1000	1001	1001	1001	1001	1001	1001	1001	1001	1001	1001	1001	1001	1001	1001	1001	1001	1001	1001
51·8	1·3	2·4	3·4	4·4	5·4	6·4	7·4	8·4	9·4	10·5	11·6	12·6	13·6	14·7	15·8	16·8	17·9	19	20	21
11 C.	1000	1000	1000	1001	1001	1001	1001	1001	1001	1001	1001	1001	1001	1001	1001	1001	1001	1001	1001	1001
53·6	1·2	2·3	3·3	4·3	5·3	6·3	7·3	8·3	9·3	10·4	11·5	12·5	13·5	14·6	15·6	16·6	17·6	18·7	19·7	20·7
12 C.	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1001	1001	1001	1001	1001	1001	1001	1001	1001
55·4	1·2	2·2	3·2	4·2	5·2	6·2	7·2	8·2	9·2	10·3	11·4	12·4	13·4	14·4	15·4	16·4	17·4	18·5	19·5	20·5
13 C.	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
57·2	1·1	2·1	3·1	4·1	5·1	6·1	7·1	8·1	9·1	10·2	11·2	12·2	13·2	14·2	15·2	16·2	17·2	18·2	19·2	20·2
14 C.	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
59·0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
15 C.	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
60·8	0·9	1·9	2·9	3·9	4·9	5·9	6·9	7·9	8·9	9·9	10·9	11·9	12·9	13·9	14·9	15·9	16·9	17·8	18·7	19·7
16 C.	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
62·6	0·8	1·8	2·8	3·8	4·8	5·8	6·8	7·8	8·8	9·8	10·8	11·7	12·7	13·7	14·7	15·6	16·6	17·5	18·4	19·4
17 C.	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	999	999
64·4	0·7	1·7	2·7	3·7	4·7	5·7	6·7	7·7	8·7	9·7	10·7	11·6	12·5	13·5	14·5	15·4	16·3	17·3	18·2	19·1
18 C.	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	999	999	999	999	999	999	999	999
66·2	0·6	1·6	2·6	3·6	4·5	5·5	6·5	7·5	8·5	9·5	10·5	11·4	12·4	13·3	14·3	15·2	16·1	17	17·9	18·8
19 C.	999	999	999	999	999	999	999	999	999	999	999	999	999	999	999	999	999	999	999	999

(GAY-LUSSAC.)—TABLE I.—*continued.*

Temp. Fahr.	Observed percentage of the Alcoholometer.																			
	1 per cent.	2 per cent.	3 per cent.	4 per cent.	5 per cent.	6 per cent.	7 per cent.	8 per cent.	9 per cent.	10 per cent.	11 per cent.	12 per cent.	13 per cent.	14 per cent.	15 per cent.	16 per cent.	17 per cent.	18 per cent.	19 per cent.	20 per cent.
68·0°	0·5	1·5	2·4	3·4	4·4	5·4	6·4	7·3	8·3	9·3	10·3	11·2	12·2	13·1	14	14·9	15·8	16·7	17·6	18·5
20°C.	999	999	999	999	999	999	999	999	999	999	999	999	999	999	999	999	999	999	999	999
69·8	0·4	1·4	2·3	3·3	4·3	5·2	6·2	7·1	8·1	9·1	10·1	11	11·9	12·8	13·7	14·6	15·5	16·4	17·3	18·2
21 C.	999	999	999	999	999	999	999	999	999	999	999	999	999	999	999	999	998	998	998	998
71·6	0·3	1·3	2·2	3·2	4·1	5·1	6·1	7	7·9	8·9	9·9	10·8	11·7	12·6	13·5	14·4	15·3	16·2	17	17·9
22 C.	999	999	999	999	999	999	999	999	999	999	999	999	999	998	998	998	998	998	998	998
73·4	0·1	1·1	2·1	3·1	4	4·9	5·9	6·8	7·8	8·7	9·7	10·6	11·5	12·4	13·3	14·1	15	15·9	16·7	17·6
23 C.	999	999	999	999	999	999	999	998	998	998	998	998	998	998	998	998	998	998	998	998
75·2		1	1·9	2·9	3·8	4·8	5·8	6·7	7·6	8·5	9·5	10·4	11·3	12·2	13·1	13·9	14·8	15·7	16·5	17·4
24 C.		998	998	998	998	998	998	998	998	998	998	998	998	998	998	998	998	998	997	997
77·0		0·8	1·7	2·7	3·6	4·6	5·5	6·5	7·4	8·3	9·3	10·2	11·1	12	12·8	13·6	14·5	15·4	16·2	17·1
25 C.		998	998	998	998	998	998	998	998	998	998	998	998	998	998	998	997	997	997	997
78·8		0·7	1·6	2·6	3·5	4·4	5·4	6·3	7·2	8·1	9	9·9	10·8	11·7	12·6	13·4	14·2	15·1	15·9	16·8
26 C		998	998	998	998	998	998	998	998	998	998	997	997	997	997	997	997	997	997	997
80·6		0·5	1·5	2·4	3·3	4·3	5·2	6·1	7	7·9	8·8	9·7	10·6	11·5	12·3	13·1	14	14·8	15·6	16·5
27 C.		998	998	998	998	998	998	998	998	998	997	997	997	997	997	997	997	997	997	997
82·4		0·3	1·3	2·2	3·1	4·1	5	5·9	6·8	7·7	8·6	9·5	10·3	11·2	12	12·8	13·7	14·5	15·3	16·1
28 C.		997	997	997	997	997	997	997	997	997	997	997	997	997	997	996	996	996	996	996
84·2		0·1	1·1	2	2·9	3·9	4·8	5·7	6·6	7·5	8·4	9·2	10·1	11	11·8	12·6	13·4	14·2	15	15·8
29 C.		997	997	997	997	997	997	997	997	997	997	997	997	997	996	996	996	996	996	996
86·0		0·0	0·9	1·9	2·8	3·7	4·6	5·5	6·4	7·3	8·1	9	9·8	10·7	11·5	12·3	13·1	14·9	14·7	15·5
30 C.		997	997	997	997	997	997	997	997	997	997	996	996	996	996	996	996	996	996	996

(GAY-LUSSAC.)—TABLE I.—*continued.*

Temp. Fahr.	Observed percentage of the Alcoholometer. 21 per cent.	22 per cent.	23 per cent.	24 per cent.	25 per cent.	26 per cent.	27 per cent.	28 per cent.	29 per cent.	30 per cent.	31 per cent.	32 per cent.	33 per cent.	34 per cent.	35 per cent.	36 per cent.	37 per cent.	38 per cent.	39 per cent.	40 per cent.
32·0°	25·6	27	28·4	29·7	30·9	32·1	33·2	34·3	35·3	36·3	37·3	38·3	39·2	40·2	41·1	42·1	43·1	44	45	45·9
0° C.	1005	1005	1006	1006	1007	1007	1007	1008	1008	1008	1009	1009	1009	1009	1009	1010	1010	1010	1010	1011
33·8	25·3	26·7	28	29·2	30·4	31·6	32·7	33·8	34·8	35·8	36·8	37·8	38·8	39·8	40·8	41·8	42·7	43·7	44·6	45·5
1 C.	1005	1005	1005	1006	1006	1006	1007	1007	1007	1008	1008	1008	1008	1008	1009	1009	1009	1009	1010	1010
35·6	24·9	26·3	27·5	28·8	30	31·2	32·3	33·3	34·4	35·4	36·4	37·4	38·4	39·4	40·4	41·4	42·3	43·3	44·2	45·1
2 C.	1004	1005	1005	1005	1006	1006	1006	1006	1007	1007	1007	1007	1008	1008	1008	1008	1008	1009	1009	1009
37·4	24·6	25·9	27·1	28·4	29·6	30·8	31·9	32·9	33·9	34·9	36	37	38	39	40	41	42	42·9	43·9	44·8
3 C.	1004	1005	1005	1005	1005	1006	1006	1006	1007	1007	1007	1007	1007	1007	1007	1008	1008	1008	1008	1008
39·2	24·3	25·6	26·8	28	29·2	30·4	31·4	32·5	33·5	34·5	35·5	36·5	37·5	38·5	39·5	40·5	41·5	42·5	43·5	44·4
4 C.	1004	1004	1005	1005	1005	1005	1005	1005	1006	1006	1006	1006	1006	1007	1007	1007	1007	1007	1007	1008
41·0	24	25·2	26·4	27·6	28·8	30	31	32·1	33·1	34·1	35·1	36·1	37·1	38·1	39·1	40·1	41·1	42·1	43·1	44
5 C.	1003	1003	1004	1004	1004	1004	1005	1005	1005	1005	1005	1006	1006	1006	1006	1006	1007	1007	1007	1007
42·8	23·6	24·9	26	27·2	28·4	29·6	30·6	31·6	32·6	33·6	34·7	35·7	36·7	37·7	38·7	39·7	40·7	41	42·6	43·6
6 C.	1003	1003	1004	1004	1004	1004	1005	1005	1005	1005	1005	1005	1005	1005	1005	1006	1006	1006	1006	1006
44·6	23·3	24·6	25·8	26·9	28	29·2	30·2	31·2	32·2	33·2	34·2	35·2	36·2	37·2	38·2	39·2	40·2	41·8	42·2	43·2
7 C.	1002	1003	1003	1003	1003	1003	1004	1004	1004	1004	1004	1004	1004	1005	1005	1005	1005	1005	1005	1005
46·4	23	24·2	25·3	26·5	27·6	28·8	29·8	30·8	31·8	32·8	33·8	34·8	35·8	36·8	37·8	38·8	39·8	40·8	41·8	42·8
8 C	1002	1002	1003	1003	1003	1003	1003	1003	1003	1003	1004	1004	1004	1004	1004	1004	1004	1004	1004	1005
48·2	22·7	23·9	25	26·1	27·2	28·4	29·4	30·4	31·4	32·4	33·4	34·4	35·4	36·4	37·4	38·4	39·4	40·4	41·4	42·4
9 C.	1002	1002	1002	1002	1002	1003	1003	1003	1003	1003	1003	1003	1003	1003	1004	1004	1004	1004	1004	1004
50·0	22·4	23·5	24·6	25·7	26·8	27·9	29	30	31	32	33	34	35	36	37	38	39	40	41	42
10 C.	1001	1002	1002	1002	1002	1002	1002	1002	1002	1002	1002	1002	1003	1003	1003	1003	1003	1003	1003	1003

(Gay-Lussac.)—Table II.—*continued.*

Temp. Fahr.	Observed percentage of the Alcoholometer.																			
	21 per cent.	22 per cent.	23 per cent.	24 per cent.	25 per cent.	26 per cent.	27 per cent.	28 per cent.	29 per cent.	30 per cent.	31 per cent.	32 per cent.	33 per cent.	34 per cent.	35 per cent.	36 per cent.	7 per cent.	38 per cent.	39 per cent.	40 per cent.
51·8°	22·1	23·2	24·3	25·4	26·5	27·6	28·6	29·6	30·6	31·6	32·6	33·6	34·6	35·6	36·6	37·6	38·6	39·6	40·6	41·6
11° C.	1001	1001	1001	1001	1002	1002	1002	1002	1002	1002	1002	1002	1002	1002	1002	1002	1002	1002	1003	1003
53·6	21·8	22·9	24	25·1	26·1	27·2	28·2	29·2	30·2	31·2	32·2	33·2	34·2	35·2	36·2	37·2	38·2	39·2	40·2	41·2
12 C.	1001	1001	1001	1001	1001	1001	1001	1001	1001	1001	1001	1001	1002	1002	1002	1002	1002	1002	1002	1002
55·4	21·5	22·6	23·6	24·7	25·7	26·8	27·8	28·8	29·8	30·8	31·8	32·8	33·8	34·8	35·8	36·8	37·8	38·8	39·8	40·8
13 C.	1001	1001	1001	1001	1001	1001	1001	1001	1001	1001	1001	1001	1001	1001	1001	1001	1001	1001	1001	1001
57·2	21·2	22·3	23·3	24·3	25·3	26·4	27·4	28·4	29·4	30·4	31·4	32·4	33·4	34·4	35·4	36·4	37·4	38·4	39·4	40·4
14 C.	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1001	1001	1001	1001	1001	1001	1001	1001
59·0	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
15 C.	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
60·8	20·7	21·7	22·7	23·7	24·7	25·7	26·6	27·6	28·6	29·6	30·6	31·6	32·5	33·5	34·5	35·5	36·5	37·5	38·5	39·5
16 C.	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	999	999	999	999	999	999	999	999
62·6	20·4	21·4	22·4	23·4	24·4	25·4	26·3	27·3	28·2	29·2	30·2	31·2	32·1	33·1	34·1	35·1	36·1	37·1	38·1	39·1
17 C.	999	999	999	999	999	999	999	999	999	999	999	999	999	999	999	999	999	999	999	999
64·4	20·1	21·1	22	23	24	25	25·9	26·9	27·8	28·8	29·8	30·8	31·7	32·7	33·7	34·7	35·7	36·7	37·9	38·7
18 C.	999	999	999	999	999	999	999	999	999	999	999	999	998	998	998	998	998	998	998	998
66·2	19·8	20·8	21·7	22·7	23·6	24·6	25·5	26·5	27·4	28·4	29·4	30·4	31·3	32·3	33·3	34·3	35·3	36·3	37·3	38·3
19 C.	999	999	999	999	998	998	998	998	998	998	998	998	998	998	998	998	998	998	997	997
68·0	19·5	20·5	21·4	22·4	23·3	24·3	25·2	26·1	27·1	28	29	30	30·9	31·9	32·9	33·9	34·9	35·9	36·9	37·9
20 C.	999	998	998	998	998	998	998	998	998	998	998	998	997	997	997	997	997	997	997	997

(GAY-LUSSAC.)—TABLE I.—*continued.*

Temp. Fahr.	Observed percentage of the Alcoholometer.																			
	21 per cent.	22 per cent.	23 per cent.	24 per cent.	25 per cent.	26 per cent.	27 per cent.	28 per cent.	29 per cent.	30 per cent.	31 per cent.	32 per cent.	33 per cent.	34 per cent.	35 per cent.	36 per cent.	37 per cent.	38 per cent.	39 per cent.	40 per cent.
69·8°	19·1	20·1	21·1	22·1	23	23·9	24·8	25·7	26·7	27·6	28·6	29·6	30·5	31·5	32·5	33·5	34·5	35·5	36·5	37·5
21° C.	998	999	998	998	998	998	998	998	997	997	997	997	997	997	997	997	997	996	996	996
71·6	18·8	19·8	20·7	21·7	22·6	23·6	24·4	25·3	26·3	27·2	28·2	29·2	30·1	31·1	32·1	33·1	34·1	35·1	36·1	37·1
22 C.	998	998	998	997	997	997	997	997	997	997	997	997	996	996	996	996	996	996	996	996
73·4	18·5	19·5	20·4	21·4	22·3	23·2	24·1	25	25·9	26·8	27·8	28·8	29·7	30·7	31·7	32·7	33·7	34·7	35·7	36·7
23 C.	998	997	997	997	997	997	997	997	997	997	996	996	996	996	996	996	996	995	995	995
75·2	18·3	19·2	20·1	21·1	21·9	22·8	23·7	24·6	25·5	26·4	27·4	28·4	29·3	30·3	31·3	32·3	33·3	34·3	35·3	36·3
24 C.	997	997	997	997	997	997	997	996	996	996	996	996	995	995	995	995	995	995	995	994
77·0	18	18·9	19·8	20·7	2[illegible]	22·5	23·3	24·3	25·2	26·1	27	28	28·9	29·9	30·9	31·9	32·9	33·9	34·9	35·9
25 C.	997	997	997	997	996	996	996	996	996	996	995	995	995	995	995	994	994	994	994	994
78·8	17·7	18·6	19·5	20·4	21·3	22·2	23	23·9	24·8	25·7	26·6	27·6	28·5	29·5	30·5	31·5	32·5	33·5	34·5	35·5
26 C.	997	996	996	996	996	996	996	996	995	995	995	995	995	994	994	994	994	994	993	993
80·6	17·4	18·3	19·2	20·1	20·9	21·8	22·7	23·6	24·4	25·3	26·2	27·2	28·1	29·1	30·1	31·1	32·1	33·1	34·1	35·1
27 C.	996	996	996	996	996	996	996	996	995	995	995	994	994	994	994	993	993	993	993	993
82·4	17	18	18·9	19·7	20·6	21·5	22·3	23·2	24	24·9	25·8	26·8	27·7	28·7	29·7	30·7	31·7	32·7	33·7	34·7
28 C.	996	996	996	995	995	995	995	995	995	994	994	994	994	993	993	993	993	993	992	992
84·2	16·7	17·6	18·5	19·4	20·3	21·1	21·9	22·8	23·7	24·5	25·4	26·4	27·3	28·3	29·3	30·3	31·3	32·3	33·3	34·3
29 C.	996	996	995	995	995	995	995	994	994	994	994	993	993	993	993	992	992	992	992	992
86·0	16·4	17·3	18·2	19·1	19·9	20·8	21·6	22·5	23·3	24·2	25·1	26	26·9	27·9	28·9	29·9	30·9	31·9	32·9	33·9
30 C.	995	995	995	995	995	994	994	994	994	994	993	993	993	993	992	992	992	991	991	991

(GAY-LUSSAC.)—TABLE I.—*continued.*

Temp. Fahr.	Observed percentage of the Alcoholometer.																			
	41 per cent.	42 per cent.	43 per cent.	44 per cent.	45 per cent.	46 per cent.	47 per cent.	48 per cent.	49 per cent.	50 per cent.	51 per cent.	52 per cent.	53 per cent.	54 per cent.	55 per cent.	56 per cent.	57 per cent.	58 per cent.	59 per cent.	60 per cent.
32·0°	46·9	47·9	48·8	49·8	50·7	51·7	52·6	53·5	54·5	55·4	56·4	57·3	58·3	59·2	60·2	61·2	62·1	63·1	64·1	65
0° C.	1011	1011	1011	1011	1011	1011	1012	1012	1012	1012	1012	1012	1012	1012	1012	1012	1012	1013	1013	1013
33·8	46·5	47·5	48·4	49·4	50·3	51·3	52·2	53·2	54·2	55·1	56	57	57·9	58·9	59·9	60·9	61·8	62·8	63·8	64·7
1 C.	1010	1010	1010	1010	1010	1011	1011	1011	1011	1011	1011	1011	1011	1011	1011	1011	1011	1012	1012	1012
35·6	46·1	47·1	48·1	49	49·9	50·9	51·8	52·8	53·8	54·7	55·7	56·6	57·6	58·5	59·5	60·5	61·5	62·4	63·4	64·4
2 C.	1009	1009	1009	1009	1010	1010	1010	1010	1010	1010	1010	1010	1010	1010	1010	1011	1011	1011	1011	1011
27·4	45·8	46·7	47·7	48·6	49·6	50·5	51·5	52·4	53·4	54·3	55·3	56·3	57·2	58·2	59·2	60·2	61·1	62·1	63·1	64·1
3 C.	1008	1009	1009	1009	1009	1009	1009	1009	1009	1009	1009	1009	1009	1010	1010	1010	1010	1010	1010	1010
39·2	45·4	46·4	47·4	48·3	49·2	50·2	51·1	52·1	53	54	55	56	56·9	57·9	58·9	59·8	60·8	61·7	62·7	63·7
4 C.	1008	1008	1008	1008	1008	1008	1008	1008	1008	1009	1009	1009	1009	1009	1009	1009	1009	1009	1009	1009
41·0	45	45·9	46·9	47·9	48·8	49·8	50·7	51·7	52·7	53·6	54·6	55·6	56·6	57·5	58·5	59·5	60·4	61·4	62·4	63·4
5 C.	1007	1007	1007	1007	1007	1007	1007	1008	1008	1008	1008	1008	1008	1008	1008	1008	1008	1008	1008	1008
42·8	44·6	45·5	46·5	47·5	48·4	49·4	50·4	51·4	52·4	53·3	54·3	55·2	56·2	57·1	58·1	59·1	60·1	61	62	63
6 C.	1006	1006	1006	1007	1007	1007	1007	1007	1007	1007	1007	1007	1007	1007	1007	1007	1007	1008	1008	1008
44·6	44·2	45·1	46·1	47·1	48·1	49·1	50·1	51	52	52·9	53·9	54·9	55·9	56·8	57·8	58·8	59·8	60·7	61·7	62·7
7 C.	1005	1006	1006	1006	1006	1006	1006	1006	1006	1006	1006	1006	1006	1006	1006	1006	1007	1007	1007	1007
46·4	43·8	44·8	45·8	46·8	47·7	48·7	49·7	50·6	51·6	52·6	53·6	54·6	55·5	56·5	57·5	58·5	59·5	60·4	61·4	62·4
8 C.	1005	1005	1005	1005	1005	1005	1005	1005	1005	1005	1005	1005	1006	1006	1006	1006	1006	1006	1006	1006
48·2	43·4	44·4	45·4	46·4	47·3	48·3	49·3	50·2	51·2	52·2	53·2	54·2	55·1	56·1	57·1	58·1	59·1	60	61	62
9 C.	1004	1004	1004	1004	1004	1004	1005	1005	1005	1005	1005	1005	1005	1005	1005	1005	1005	1005	1005	1005

(GAY-LUSSAC.)—TABLE I.—*continued.*

Temp. Fahr.	Observed percentage of the Alcoholometer.																			
	41 per cent.	42 per cent.	43 per cent.	44 per cent.	45 per cent.	46 per cent.	47 per cent.	48 per cent.	49 per cent.	50 per cent.	51 per cent.	52 per cent.	53 per cent.	54 per cent.	55 per cent.	56 per cent.	57 per cent.	58 per cent.	59 per cent.	60 per cent.
50·0°	43	44	45	46	46·9	47·9	48·9	49·9	50·9	51·8	52·8	53·8	54·8	55·8	56·8	57·8	58·8	59·7	60·7	61·7
10°C.	1003	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004
51·8	42·6	43·6	44·6	45·6	46·6	47·6	48·6	49·5	50·5	51·5	52·5	53·5	54·4	55·4	56·4	57·4	58·4	59·4	60·4	61·4
11 C.	1003	1003	1003	1003	1003	1003	1003	1003	1003	1003	1003	1003	1003	1003	1003	1003	1003	1003	1003	1003
53·6	42·2	43·2	44·2	45·2	46·2	47·2	48·2	49·2	50·2	51·1	52·1	53·1	54·1	55	56	57	58	59	60	61
12 C.	1002	1002	1002	1002	1002	1002	1002	1002	1002	1002	1002	1002	1002	1002	1002	1002	1002	1002	1002	1002
55·4	41·8	42·8	43·8	44·8	45·8	46·8	47·8	48·8	49·8	50·8	51·8	52·7	53·7	54·7	55·7	56·7	57·7	58·7	59·7	60·7
13 C.	1001	1001	1001	1002	1002	1002	1002	1002	1002	1002	1002	1002	1002	1002	1002	1002	1002	1002	1002	1002
57·2	41·4	42·4	43·4	44·4	45·4	46·4	47·4	48·4	49·4	50·4	51·4	52·3	53·3	54·3	55·3	56·3	57·3	58·3	59·3	60·3
14 C.	1001	1001	1001	1001	1001	1001	1001	1001	1001	1001	1001	1001	1001	1001	1001	1001	1001	1001	1001	1001
59·0	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
15 C.	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
60·8	40·6	41·6	42·6	43·6	44·6	45·6	46·6	47·6	48·6	49·6	50·6	51·6	52·6	53·6	54·6	55·6	56·6	57·6	58·6	59·6
16 C.	999	999	999	999	999	999	999	999	999	999	999	999	999	999	999	999	999	999	999	999
62·6	40·2	41·2	42·2	43·2	44·2	45·2	46·2	47·2	48·3	49·3	50·3	51·3	52·3	53·3	54·3	55·3	56·3	57·3	58·3	59·3
17 C.	999	999	999	998	998	998	998	998	998	998	998	998	998	998	998	998	998	998	998	998
64·4	39·8	40·8	41·8	42·8	43·8	44·9	45·9	46·9	47·9	48·9	49·9	50·9	51·9	52·9	53·9	54·9	55·9	56·9	57·9	58·9
18 C.	998	998	998	998	998	998	998	998	998	998	998	998	998	998	998	998	998	997	997	997
66·2	39·4	40·4	41·4	42·5	43·5	44·5	45·5	46·5	47·5	48·5	49·5	50·6	51·6	52·6	53·6	54·6	55·6	56·6	57·6	58·6
19 C.	997	997	997	997	997	997	997	997	997	997	997	997	997	997	997	997	997	997	997	997

(GAY-LUSSAC.)—TABLE I.—*continued.*

Temp. Fahr.	41 per cent.	42 per cent.	43 per cent.	44 per cent.	45 per cent.	46 per cent.	47 per cent.	48 per cent.	49 per cent.	50 per cent.	51 per cent.	52 per cent.	53 per cent.	54 per cent.	55 per cent.	56 per cent.	57 per cent.	58 per cent.	59 per cent.	60 per cent.
	Observed percentage of the Alcoholometer.																			
68·0°	39	40	41	42·1	43·1	44·1	45·1	46·1	47·2	48·2	49·2	50·2	51·2	52·2	53·2	54·2	55·2	56·2	57·2	58·2
20° C.	997	997	997	997	996	996	996	996	996	996	996	996	996	996	996	996	996	996	996	996
69·8	38·6	39·6	40·6	41·7	42·7	43·7	44·8	45·8	46·8	47·8	48·8	49·8	50·8	51·8	52·9	53·9	54·9	55·9	56·9	57·9
21 C.	996	996	996	996	996	996	996	996	995	995	995	995	995	995	995	995	995	995	995	995
71·6	38·2	39·2	40·2	41·3	42·3	43·3	44·3	45·3	46·4	47·4	48·4	49·4	50·4	51·4	52·5	53·5	54·5	55·5	56·5	57·5
22 C.	996	995	995	995	995	995	995	995	995	995	995	995	995	994	994	994	994	994	994	994
73·4	37·8	38·8	39·8	40·9	41·9	42·9	43·9	44·9	46	47	48	49·1	50·1	51·1	52·1	53·1	54·1	55·1	56·1	57·1
23 C.	995	995	995	994	994	994	994	994	994	994	994	994	994	994	994	994	993	993	993	993
75·2	37·4	38·4	39·4	40·5	41·5	42·5	43·6	44·6	45·6	46·6	47·6	48·7	49·7	50·7	51·8	52·8	53·8	54·8	55·8	56·8
24 C.	994	994	994	994	994	994	994	994	993	993	993	993	993	993	993	993	993	993	993	992
77·0	37	38	39	40·1	41·1	42·2	43·2	44·2	45·2	46·3	47·3	48·3	49·3	50·3	51·4	52·4	53·4	54·4	55·5	56·5
25 C.	994	994	993	993	993	993	993	993	993	993	993	993	993	992	992	992	992	992	992	992
78·8	36·5	37·6	38·6	39·7	40·7	41·8	42·8	43·8	44·9	45·9	46·9	47·9	49	50	51	52	53	54	55·1	56·1
26 C.	993	993	993	993	992	992	992	992	992	992	992	992	992	991	991	991	991	991	991	991
80·6	36·1	37·2	38·2	39·3	40·3	41·4	42·4	43·4	44·5	45·5	46·5	47·6	48·6	49·6	50·7	51·7	52·7	53·7	54·8	55·8
27 C.	992	992	992	992	992	992	992	991	991	991	991	991	991	991	990	990	990	990	990	990
82·4	35·7	36·8	37·8	38·9	39·9	41	42	43	44·1	45·1	46·1	47·2	48·2	49·2	50·3	51·3	52·3	53·3	54·4	55·4
28 C.	992	992	992	991	991	991	991	991	991	990	990	990	990	990	990	990	990	989	989	989
84·2	35·3	36·3	37·4	38·5	39·5	40·6	41·6	42·6	43·7	44·7	45·7	46·8	47·8	48·9	49·9	51	52	53	54	55
29 C.	991	991	991	991	991	990	990	990	990	990	990	989	989	989	989	989	989	989	989	988
86·0	34·9	35·9	37	38·1	39·1	40·2	41·2	42·3	43·3	44·3	45·4	46·4	47·5	48·5	49·6	50·6	51·6	52·6	53·6	54·7
30 C.	991	991	990	990	990	990	990	989	989	989	989	989	989	988	988	988	988	988	988	988

(GAY-LUSSAC.)—TABLE I.—*continued.*

Temp. Fahr.	Observed percentage of the Alcoholometer.																			
	61 per cent.	62 per cent.	63 per cent.	64 per cent.	65 per cent.	66 per cent.	67 per cent.	68 per cent.	69 per cent.	70 per cent.	71 per cent.	72 per cent.	73 per cent.	74 per cent.	75 per cent.	76 per cent.	77 per cent.	78 per cent.	79 per cent.	80 per cent.
32·0°	66	67	68	68·9	69·9	70·8	71·8	72·7	73·7	74·7	75·6	76·6	77·6	78·6	79·5	80·5	81·5	82·4	83·3	84·3
0° C.	1013	1013	1013	1013	1013	1013	1013	1013	1014	1014	1014	1014	1014	1014	1014	1014	1014	1014	1014	1014
33·8	65·7	66·7	67·7	68·6	69·6	70·5	71·5	72·4	73·4	74·3	75·3	76·3	77·3	78·3	79·2	80·2	81·2	82·1	83·1	84
1 C.	1012	1012	1012	1012	1012	1012	1012	1012	1013	1013	1013	1013	1013	1013	1013	1013	1013	1013	1013	1013
35·6	65·3	66·3	67·3	68·3	69·3	70·2	71·2	72·1	73·1	74	75	76	77	78	78·9	79·9	80·9	81·9	82·8	83·7
2 C.	1011	1011	1011	1011	1011	1011	1011	1012	1012	1012	1012	1012	1012	1012	1012	1012	1012	1012	1012	1012
37·4	65	66	67	68	68·9	69·9	70·8	71·8	72·8	73·7	74·7	75·7	76·7	77·7	78·6	79·6	80·6	81·6	82·5	83·5
3 C.	1010	1010	1010	1010	1010	1011	1011	1011	1011	1011	1011	1011	1011	1011	1011	1011	1011	1011	1011	1011
39·2	64·7	65·7	66·6	67·6	68·6	69·5	70·5	71·5	72·5	73·4	74·4	75·3	76·3	77·3	78·3	79·3	80·3	81·3	82·2	83·2
4 C.	1009	1009	1009	1010	1010	1010	1010	1010	1010	1010	1010	1010	1010	1010	1010	1010	1010	1010	1010	1010
41·0	64·3	65·3	66·3	67·3	68·3	69·2	70·2	71·2	72·2	73·1	74·1	75	76	77	78	79	80	81	81·9	82·9
5 C.	1009	1009	1009	1009	1009	1009	1009	1009	1009	1009	1009	1009	1009	1009	1009	1009	1009	1009	1010	1010
42·8	64	65	66	67	68	68·9	69·9	70·9	71·9	72·8	73·8	74·7	75·7	76·7	77·7	78·7	79·7	80·7	81·6	82·6
6 C.	1008	1008	1008	1008	1008	1008	1008	1008	1008	1008	1008	1008	1008	1008	1008	1008	1008	1008	1008	1009
44·6	63·7	64·7	65·7	66·7	67·6	68·6	69·6	70·6	71·5	72·5	73·5	74·4	75·4	76·4	77·4	78·4	79·4	80·4	81·4	82·3
7 C.	1007	1007	1007	1007	1007	1007	1007	1007	1007	1007	1007	1007	1007	1007	1007	1007	1007	1007	1007	1008
46·4	63·4	64·4	65·4	66·4	67·3	68·3	69·3	70·2	71·2	72·2	73·2	74·1	75·1	76·1	77·1	78·1	79·1	80·1	81·1	82
8 C.	1006	1006	1006	1006	1006	1006	1006	1006	1006	1006	1006	1006	1006	1006	1006	1006	1007	1007	1007	1007
48·2	63	64	65	66	67	67·9	68·9	69·9	70·9	71·9	72·9	73·8	74·8	75·8	76·8	77·8	78·8	79·8	80·8	81·7
9 C.	1005	1005	1005	1005	1005	1005	1005	1005	1005	1005	1005	1005	1005	1005	1005	1005	1006	1006	1006	1006
50·0	62·7	63·7	64·7	65·7	66·7	67·6	68·6	69·6	70·6	71·6	72·6	73·5	74·5	75·5	76·5	77·5	78·5	79·5	80·5	81·5
10 C.	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004	1005	1005	1005	1005	1005	1005	1005	1005

(GAY-LUSSAC.)—TABLE I.—*continued.*

Temp. Fahr.	Observed percentage of the Alcoholometer.																			
	61 per cent.	62 per cent.	63 per cent.	64 per cent.	65 per cent.	66 per cent.	67 per cent.	68 per cent.	69 per cent.	70 per cent.	71 per cent.	72 per cent.	73 per cent.	74 per cent.	75 per cent.	76 per cent.	77 per cent.	78 per cent.	79 per cent.	80 per cent.
51·8°	62·4	63·4	64·4	65·4	66·4	67·3	68·3	69·3	70·3	71·3	72·3	73·2	74·2	75·2	76·2	77·2	78·2	79·2	80·2	81·2
11° C.	1003	1003	1003	1003	1003	1003	1003	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004
53·6	62	63	64	65	66	67	68	69	70	71	72	72·9	73·9	74·9	75·9	76·9	77·9	78·9	79·9	80·9
12 C.	1002	1002	1002	1002	1002	1002	1003	1003	1003	1003	1003	1003	1003	1003	1003	1003	1003	1003	1003	1003
55·4	61·7	62·7	63·7	64·7	65·7	66·7	67·7	68·7	69·6	70·6	71·6	72·6	73·6	74·6	75·6	76·6	77·6	78·6	79·6	80·6
13 C.	1002	1002	1002	1002	1002	1002	1002	1002	1002	1002	1002	1002	1002	1002	1002	1002	1002	1002	1002	1002
57·2	61·3	62·3	63·3	64·3	65·3	66·3	67·3	68·3	69·3	70·3	71·3	72·3	73·3	74·3	75·3	76·3	77·3	78·3	79·3	80·3
14 C.	1001	1001	1001	1001	1001	1001	1001	1001	1001	1001	1001	1001	1001	1001	1001	1001	1001	1001	1001	1001
59·0	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
15 C.	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
60·8	60·6	61·7	62·7	63·7	64·7	65·7	66·7	67·7	68·7	69·7	70·7	71·7	72·7	73·7	74·7	75·7	76·7	77·7	78·7	79·7
16 C.	999	999	999	999	999	999	999	999	999	999	999	999	999	999	999	999	999	999	999	999
62·6	60·3	61·3	62·3	63·3	64·3	65·3	66·3	67·3	68·3	69·3	70·3	71·3	72·3	73·3	74·3	75·4	76·4	77·4	78·4	79·4
17 C.	998	998	998	998	998	998	998	998	998	998	998	998	998	998	998	998	998	998	998	998
64·4	59·9	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75·1	76·1	77·1	78·1	79·1
18 C.	997	997	997	997	997	997	997	997	997	997	997	997	997	997	997	997	997	997	997	997
66·2	59·6	60·6	61·6	62·7	63·7	64·7	65·7	66·7	67·7	68·7	69·7	70·7	71·7	72·7	73·7	74·7	75·8	76·8	77·8	78·8
19 C.	997	997	997	997	997	997	997	997	996	996	996	996	996	996	996	996	996	996	996	996
68·0	59·2	60·3	61·3	62·3	63·3	64·3	65·4	66·4	67·4	68·4	69·4	70·4	71·4	72·4	73·4	74·4	75·5	76·5	77·5	78·5
20 C.	996	996	996	996	996	996	996	996	996	996	996	996	995	995	995	995	995	995	995	995

(Gay-Lussac.)—Table 1.—*continued.*

Temp. Fahr.	Observed percentage of the Alcoholometer.																			
	61 per cent.	62 per cent.	63 per cent.	64 per cent.	65 per cent.	66 per cent.	67 per cent.	68 per cent.	69 per cent.	70 per cent.	71 per cent.	72 per cent.	73 per cent.	74 per cent.	75 per cent.	76 per cent.	77 per cent.	78 per cent.	79 per cent.	80 per cent.
69·8°	58·9	59·9	61	62	63	64	65	66	67	68·1	69·1	70·1	71·1	72·1	73·1	74·1	75·2	76·2	77·2	78·2
21° C.	995	995	995	995	995	995	995	995	995	995	995	995	995	994	994	994	994	994	994	994
71·6	58·5	59·5	60·6	61·6	62·7	63·7	64·7	65·7	66·7	67·8	68·8	69·8	70·8	71·8	72·8	73·8	74·8	75·9	76·9	77·9
22 C.	994	994	994	994	994	994	994	994	994	994	994	994	994	994	993	993	993	993	993	993
73·4	58·1	59·2	60·2	61·3	62·3	63·3	64·3	65·4	66·4	67·4	68·4	69·4	70·5	71·5	72·5	73·5	74·5	75·5	76·6	77·6
23 C.	993	993	993	993	993	993	993	993	993	993	993	993	993	993	992	992	992	992	992	992
75·2	57·8	58·9	59·9	61	62	63	64	65	66	67·1	68·1	69·1	70·1	71·2	72·2	73·2	74·2	75·2	76·3	77·3
24 C.	992	992	992	992	992	992	992	992	992	992	992	992	992	992	992	992	992	991	991	991
77·0	57·5	58·5	59·5	60·6	61·6	62·6	63·7	64·7	65·7	66·7	67·8	68·8	69·8	70·8	71·8	72·8	73·9	74·9	76	77
25 C.	992	992	992	991	991	991	991	991	991	991	991	991	991	991	991	991	991	991	991	991
78·8	57·1	58·1	59·2	60·2	61·3	62·3	63·3	64·3	65·3	66·4	67·4	68·4	69·5	70·5	71·5	72·5	73·6	74·6	75·6	76·7
26 C.	991	991	991	991	990	990	990	990	990	990	990	990	990	990	990	990	990	990	990	990
80·6	56·8	57·8	58·9	59·9	60·9	61·9	63	64	65	66	67·1	68·1	69·2	70·2	71·2	72·2	73·3	74·3	75·3	76·3
27 C.	990	990	990	990	990	990	989	989	989	989	989	989	989	989	989	989	989	989	989	989
82·4	56·4	57·5	58·5	59·5	60·6	61·6	62·6	63·7	64·7	65·7	66·8	67·8	68·8	69·9	70·9	71·9	73	74	75	76
28 C.	989	989	989	989	989	989	989	989	989	988	988	988	988	988	988	988	988	988	988	988
84·2	56	57·1	58·1	59·2	60·2	61·2	62·3	63·3	64·3	65·4	66·4	67·4	68·5	69·5	70·6	71·6	72·6	73·7	74·7	75·7
29 C.	988	988	988	988	988	988	988	988	988	988	988	987	987	987	987	987	987	987	987	987
86·0	55·7	56·7	57·8	58·8	59·9	60·9	61·9	63	64	65	66·1	67·1	68·2	69·2	70·3	71·3	72·3	73·3	74·4	75·4
30 C.	988	987	987	987	987	987	987	987	987	987	987	987	986	986	986	986	986	986	986	986

(GAY-LUSSAC.)—TABLE I.—*continued*

Temp. Fahr.	81 per cent.	82 per cent.	83 per cent.	84 per cent.	85 per cent.	86 per cent.	87 per cent.	88 per cent.	89 per cent.	90 per cent.	91 per cent.	92 per cent.	93 per cent.	94 per cent.	95 per cent.	96 per cent.	97 per cent.	98 per cent.	99 per cent.	100 per cent.
	Observed percentage of the Alcoholometer.																			
32·0°	85·2	86·2	87·1	88	88·9	89·9	90·8	91·7	92·6	93·6	94·5	95·3	96·2	97·1	98	98·8	99·7			
0° C.	1014	1014	1014	1014	1014	1015	1015	1015	1015	1015	1015	1015	1015	1015	1015	1015	1016			
33·8	85	85·9	86·8	87·8	88·7	89·6	90·5	91·5	92·4	93·3	94·3	95·1	96	96·9	97·8	98·6	99·5			
1 C.	1013	1013	1013	1013	1013	1014	1014	1014	1014	1014	1014	1014	1014	1014	1014	1014	1014			
35·6	84·7	85·6	86·6	87·5	88·5	89·4	90·3	91·2	92·2	93·1	94	94·9	95·8	96·7	97·6	98·5	99·3			
2 C.	1012	1012	1012	1012	1012	1013	1013	1013	1013	1013	1013	1013	1013	1013	1013	1013	1014			
37·4	84·4	85·4	86·3	87·3	88·2	89·2	90·1	91	91·9	92·9	93·8	94·7	95·6	96·5	97·4	98·3	99·2			
3 C.	1011	1011	1011	1011	1011	1012	1012	1012	1012	1012	1012	1012	1012	1012	1012	1012	1012	1012		
39·2	84·2	85·1	86·1	87	87·9	88·9	89·8	90·8	91·7	92·7	93·6	94·5	95·4	96·3	97·2	98·1	99	99·9		
4 C.	1011	1011	1011	1011	1011	1011	1011	1011	1011	1011	1011	1011	1011	1011	1011	1011	1011	1011		
41·0	83·9	84·8	85·8	86·7	87·7	88·6	89·6	90·5	91·5	92·4	93·4	94·3	95·2	96·1	97	97·9	98·8	99·7		
5 C.	1010	1010	1010	1010	1010	1010	1010	1010	1010	1010	1010	1010	1010	1010	1010	1010	1010	1010		
42·8	83·6	84·5	85·5	86·5	87·4	88·4	89·3	90·2	91·2	92·2	93·1	94·1	95	95·9	96·8	97·8	98·7	99·6		
6 C.	1009	1009	1009	1009	1009	1009	1009	1009	1009	1009	1009	1009	1009	1009	1009	1009	1009	1009		
44·6	83·3	84·2	85·2	86·2	87·2	88·1	89·1	90	91	91·9	92·9	93·9	94·8	95·7	96·6	97·6	98·5	99·4		
7 C.	1008	1008	1008	1008	1008	1008	1008	1008	1008	1008	1008	1008	1008	1008	1008	1008	1008	1008		
46·4	83	84	85	85·9	86·9	87·9	88·8	89·8	90·7	91·7	92·7	93·6	94·6	95·5	96·4	97·4	98·3	99·2		
8 C.	1007	1007	1007	1007	1007	1007	1007	1007	1007	1007	1007	1007	1007	1007	1007	1007	1007	1007	1007	
48·2	82·7	83·7	84·7	85·7	86·6	87·6	88·6	89·5	90·5	91·5	92·5	93·4	94·4	95·3	96·2	97·2	98·1	99·1	100	
9 C.	1006	1006	1006	1006	1006	1006	1006	1006	1006	1006	1006	1006	1006	1006	1006	1006	1006	1006	1006	

(GAY-LUSSAC.)—TABLE I.—*continued.*

Temp. Fahr.	Observed percentage of the Alcoholometer.																			
	81 per cent.	82 per cent.	83 per cent.	84 per cent.	85 per cent.	86 per cent.	87 per cent.	88 per cent.	89 per cent.	90 per cent.	91 per cent.	92 per cent.	93 per cent.	94 per cent.	95 per cent.	96 per cent.	97 per cent.	98 per cent.	99 per cent.	100 per cent.
50·0°	82·4	83·4	84·4	85·4	86·4	87·4	88·3	89·3	90·2	91·2	92·2	93·2	94·2	95·1	96	97	98	98·9	99·9	
10° C.	1005	1005	1005	1005	1005	1005	1005	1005	1005	1005	1005	1005	1005	1005	1005	1005	1005	1005	1005	
51·8	82·2	83·1	84·1	85·1	86·1	87·1	88	89	90	91	92	92·9	93·9	94·9	95·8	96·8	97·8	98·7	99·7	
11 C.	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004	
53·6	81·9	82·9	83·9	84·8	85·8	86·8	87·8	88·7	89·7	90·7	91·7	92·7	93·7	94·7	95·6	96·6	97·6	98·5	99·5	
12 C.	1003	1003	1003	1003	1003	1003	1003	1003	1003	1003	1003	1003	1003	1003	1003	1003	1003	1003	1003	
55·4	81·6	82·6	83·6	84·6	85·5	86·5	87·5	88·5	89·5	90·5	91·5	92·5	93·5	94·4	95·4	96·4	97·4	98·4	99·3	
13 C.	1002	1002	1002	1002	1002	1002	1002	1002	1002	1002	1002	1002	1002	1002	1002	1002	1002	1002	1002	
57·2	81·3	82·3	83·3	84·3	85·3	86·3	87·3	88·2	89·2	90·2	91·2	92·2	93·2	94·2	95·2	96·2	97·2	98·2	99·2	
14 C.	1001	1001	1001	1001	1001	1001	1001	1001	1001	1001	1001	1001	1001	1001	1001	1001	1001	1001	1001	
59·0	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
15 C.	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
60·8	80·7	81·7	82·7	83·7	84·7	85·2	86·7	87·7	88·7	89·7	90·8	91·8	92·8	93·8	94·8	95·8	96·8	97·8	98·8	99·8
16 C.	999	999	999	999	999	999	999	999	999	999	999	999	999	999	999	999	999	999	999	999
62·6	80·4	81·4	82·4	83·4	84·4	85·4	86·4	87·4	88·4	89·5	90·5	91·5	92·6	93·6	94·6	95·6	96·6	97·6	98·7	99·7
17 C.	998	998	998	998	998	998	998	998	998	998	998	998	998	998	998	998	998	998	998	998
64·4	80·1	81·1	82·1	83·1	84·1	85·2	86·2	87·2	88·2	89·2	90·2	91·3	92·3	93·3	94·3	95·4	96·4	97·4	98·5	99·5
18 C.	997	997	997	997	997	997	997	997	997	997	997	997	997	997	997	997	997	997	997	997
66·2	79·8	80·8	81·9	82·9	83·9	84·9	85·9	86·9	87·9	88·9	90	91·1	92·1	93·1	94·1	95·2	96·2	97·3	98·3	99·3
19 C.	996	996	996	996	996	996	996	996	996	996	996	996	996	996	996	996	996	996	996	996

(GAY-LUSSAC.)—TABLE I.—*continued.*

Temp. Fahr.	Observed percentage of the Alcoholometer.																			
	81 per cent.	82 per cent.	83 per cent.	84 per cent.	85 per cent.	86 per cent.	87 per cent.	88 per cent.	89 per cent.	90 per cent.	91 per cent.	92 per cent.	93 per cent.	94 per cent.	95 per cent.	96 per cent.	97 per cent.	98 per cent.	99 per cent.	100 per cent.
68·0°	79·5	80·5	81·6	82·6	83·6	84·6	85·6	86·6	87·7	88·7	89·7	90·8	91·8	92·9	93·9	95	96	97·1	98·1	99·1
20° C.	995	995	995	995	995	995	995	995	995	995	995	995	995	995	995	995	995	995	995	995
69·8	79·2	80·2	81·3	82·3	83·3	84·3	85·3	86·4	87·4	88·4	89·5	90·5	91·6	92·6	93·7	94·7	95·8	96·9	97·9	99
21 C.	994	994	994	994	994	994	994	994	994	994	994	994	994	994	994	994	994	994	994	994
71·6	78·9	79·9	81	82	83	84	85	86·1	87·1	88·2	89·2	90·2	91·3	92·4	93·4	94·5	95·6	96·7	97·7	98·8
22 C.	993	993	993	993	993	993	993	993	993	993	993	993	993	993	993	993	993	993	993	993
73·4	78·6	79·6	80·7	81·7	82·7	83·8	84·8	85·8	86·8	87·9	89	90	91·1	92·1	93·2	94·3	95·4	96·5	97·5	98·6
23 C.	992	992	992	992	992	992	992	992	992	992	992	992	992	992	992	992	992	992	992	992
75·2	78·3	79·3	80·4	81·4	82·4	83·5	84·5	85·5	86·5	87·6	88·7	89·7	90·8	91·9	93	94·1	95·2	96·2	97·3	98·4
24 C.	991	991	991	991	991	991	991	991	991	991	991	991	991	991	991	991	991	991	991	991
77·0	78	79	80·1	81·1	82·1	83·2	84·2	85·2	86·3	87·4	88·4	89·5	90·6	91·6	92·7	93·8	94·9	96	97·1	98·2
25 C.	991	991	990	990	990	990	990	990	990	990	990	990	990	990	990	990	990	990	990	990
78·8	77·7	78·7	79·8	80·8	81·8	82·9	83·9	84·9	86	87·1	88·2	89·2	90·3	91·4	92·5	93·6	94·7	95·8	96·9	98·1
26 C.	990	989	989	989	989	989	989	989	989	989	989	989	989	989	989	989	989	989	989	989
80·6	77·4	78·4	79·5	80·5	81·5	82·6	83·6	84·7	85·7	86·8	87·9	89	90·1	91·1	92·2	93·4	94·5	95·6	96·7	97·9
27 C.	989	988	988	988	988	988	988	988	988	988	988	988	988	988	988	988	988	987	987	987
82·4	77·1	78·1	79·2	80·2	81·2	82·3	83·3	84·4	85·4	86·5	87·6	88·7	89·8	90·9	92	93·1	94·3	95·4	96·5	97·7
28 C.	988	988	987	987	987	987	987	987	987	987	987	987	987	987	987	987	987	986	986	986
84·2	76·7	77·8	78·9	79·9	80·9	82	83	84·1	85·1	86·2	87·3	88·4	89·5	90·6	91·7	92·9	94·1	95·2	96·3	97·5
29 C.	987	987	987	986	986	986	986	986	986	986	986	986	986	986	986	986	986	986	985	985
86·0	76·4	77·7	78·6	79·6	80·6	81·7	82·7	83·8	84·9	86	87·1	88·2	89·3	90·4	91·5	92·7	93·8	95	96·1	97·3
30 C.	986	986	986	986	985	985	985	985	985	985	985	985	985	985	985	985	985	985	984	984

(GAY-LUSSAC.)—ALCOHOLOMETRIC TABLE II.

To find directly the percentage of absolute alcohol of a liquid at any temperature from the observed percentage at the same temperature.

Temp.		Observed percentage of the Alcoholometer.																			
F.	C.	1 per cent.	2 per cent.	3 per cent.	4 per cent.	5 per cent.	6 per cent.	7 per cent.	8 per cent.	9 per cent.	10 per cent.	11 per cent.	12 per cent.	13 per cent.	14 per cent.	15 per cent.	16 per cent.	17 per cent.	18 per cent.	19 per cent.	20 per cent.
32·0	0	1·3	2·4	3·4	4·4	5·4	6·5	7·5	8·6	9·7	10·9	12·2	13·4	14·7	16·1	17·5	19	20·4	21·7	23	24·3
33·8	1											—	13·4	14·7	16	17·3	18·7	20·1	21·4	22·7	24
35·6	2											—	13·4	14·7	16	17·2	18·6	19·9	21·2	22·4	23·7
37·4	3											—	13·3	14·6	15·9	17·1	18·3	19·7	20·9	22·1	23·4
39·2	4											—	13·3	14·5	15·8	16·9	18·1	19·4	20·7	21·9	23·1
41·0	5	1·4	2·5	3·5	4·5	5·5	6·6	7·7	8·7	9·8	10·9	12·1	13·2	14·4	15·7	16·8	18	19·2	20·5	21·6	22·8
42·8	6											—	13·1	14·3	15·6	16·7	17·8	19	20·3	21·4	22·5
44·6	7											—	13	14·2	15·4	16·6	17·7	18·8	20	21	22·1
46·4	8											—	13	14·1	15·3	16·4	17·5	18·6	19·7	20·7	21·8
48·2	9											—	12·9	14	15·1	16·2	17·3	18·4	19·5	20·5	21·6
50·0	10	1·4	2·4	3·4	4·5	5·5	6·5	7·5	8·5	9·5	10·6	11·7	12·7	13·8	14·9	16	17	18·1	19·2	20·2	21·3
51·8	11	1·3	2·4	3·4	4·4	5·4	6·4	7·4	8·4	9·4	10·5	11·6	12·6	13·6	14·7	15·8	16·8	17·9	19	20	21
53·6	12	1·2	2·3	3·3	4·3	5·3	6·3	7·3	8·3	9·3	10·4	11·5	12·5	13·5	14·6	15·6	16·6	17·6	18·7	19·7	20·7
55·4	13	1·2	2·2	3·2	4·2	5·2	6·2	7·2	8·2	9·2	10·3	11·4	12·4	13·4	14·4	15·4	16·4	17·4	18·5	19·5	20·5
57·2	14	1·1	2·1	3·1	4·1	5·1	6·1	7·1	8·1	9·1	10·2	11·2	12·2	13·2	14·2	15·2	16·2	17·2	18·2	19·2	20·2
59·0	15	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
60·8	16	0·9	1·9	2·9	3·9	4·9	5·9	6·9	7·9	8·9	9·9	10·9	11·9	12·9	13·9	14·9	15·9	16·9	17·8	18·7	19·7
62·6	17	0·8	1·8	2·8	3·8	4·8	5·8	6·8	7·8	8·8	9·8	10·8	11·7	12·7	13·7	14·7	15·6	16·6	17·5	18·4	19·4
64·4	18	0·7	1·7	2·7	3·7	4·7	5·7	6·7	7·7	8·7	9·7	10·7	11·6	12·5	13·5	14·5	15·4	16·3	17·3	18·2	19·1

(GAY-LUSSAC.)—TABLE II.—*continued.*

Temp. F.	Temp. C.	Observed percentage of the Alcoholometer. 1 per cent.	2 per cent.	3 per cent.	4 per cent.	5 per cent.	6 per cent.	7 per cent.	8 per cent.	9 per cent.	10 per cent.	11 per cent.	12 per cent.	13 per cent.	14 per cent.	15 per cent.	16 per cent.	17 per cent.	18 per cent.	19 per cent.	20 per cent.
66·2	19	0·6	1·6	2·6	3·6	4·5	5·5	6·5	7·5	8·5	9·5	10·5	11·4	12·4	13·3	14·3	15·2	16·1	17	17·9	18·8
68·0	20	0·5	1·5	2·4	3·4	4·4	5·4	6·4	7·3	8·3	9·3	10·3	11·2	12·2	13·1	14	14·9	15·8	16·7	17·6	18·5
69·8	21	0·4	1·4	2·3	3·3	4·3	5·2	6·2	7·1	8·1	9·1	10·1	11	11·9	12·8	13·7	14·6	15·5	16·4	17·3	18·2
71·6	22	0·3	1·3	2·2	3·2	4·1	5·1	6·1	7	7·9	8·9	9·9	10·8	11·7	12·6	13·5	14·4	15·3	16·2	17	17·9
73·4	23	0·1	1·1	2·1	3·1	4	4·9	5·9	6·8	7·8	8·7	9·7	10·6	11·5	12·4	13·3	14·1	15	15·9	16·7	17·6
75·2	24	0·0	1	1·9	2·9	3·8	4·8	5·8	6·7	7·6	8·5	9·5	10·4	11·3	12·2	13·1	13·9	14·8	15·7	16·5	17·4
77·0	25	—	0·8	1·7	2·7	3·6	4·6	5·5	6·5	7·4	8·3	9·3	10·2	11·1	12	12·8	13·6	14·5	15·4	16·2	17·1
78·8	26	—	0·7	1·6	2·6	3·5	4·4	5·4	6·3	7·2	8·1	9	9·9	10·8	11·7	12·6	13·4	14·2	15·1	15·9	16·7
80·6	27	—	0·5	1·5	2·4	3·3	4·3	5·2	6·1	7	7·9	8·8	9·7	10·6	11·5	12·3	13·1	13·9	14·8	15·6	16·4
82·4	28	—	0·3	1·3	2·2	3·1	4·1	5	5·9	6·8	7·7	8·6	9·5	10·3	11·2	12	12·8	13·6	14·4	15·2	16
84·2	29	—	0·1	1·1	2	2·9	3·9	4·8	5·7	6·6	7·5	8·4	9·2	10·1	11	11·7	12·5	13·3	14·1	14·9	15·7
86·0	30	—	0·0	0·9	1·9	2·8	3·7	4·6	5·5	6·4	7·3	8·1	9	9·8	10·7	11·5	12·3	13	13·8	14·6	15·4

Temp. F.	Temp. C.	21 per cent.	22 per cent.	23 per cent.	24 per cent.	25 per cent.	26 per cent.	27 per cent.	28 per cent.	29 per cent.	30 per cent.	31 per cent.	32 per cent.	33 per cent.	34 per cent.	35 per cent.	36 per cent.	37 per cent.	38 per cent.	39 per cent.	40 per cent.
32·0	0	25·7	27·1	28·5	29·9	31·1	32·3	33·4	34·5	35·6	36·6	37·6	38·5	39·6	40·6	41·5	42·5	43·5	44·4	45·4	46·4
33·8	1	25·4	26·8	28·1	29·4	30·6	31·8	32·9	34	35·1	36·1	37·1	38·1	39·1	40·1	41·2	42·2	43·1	44·1	45	46
35·6	2	25	26·4	27·6	28·9	30·2	31·4	32·5	33·5	34·6	35·6	36·7	37·7	38·7	39·7	40·7	41·7	42·7	43·7	44·6	45·5
37·4	3	24·7	26	27·3	28·6	29·8	31	32·1	33·1	34·1	35·2	36·2	37·3	38·3	39·3	40·3	41·3	42·3	43·2	44·2	45·2

(GAY-LUSSAC).—TABLE II.—*continued.*

Temp. F.	Temp. C.	Observed percentage of the Alcoholometer. 21 per cent.	22 per cent.	23 per cent.	24 per cent.	25 per cent.	26 per cent.	27 per cent.	28 per cent.	29 per cent.	30 per cent.	31 per cent.	32 per cent.	33 per cent.	34 per cent.	35 per cent.	36 per cent.	37 per cent.	38 per cent.	39 per cent.	40 per cent.
39·2	4	24·4	25·7	26·9	28·1	29·3	30·6	31·6	32·7	33·7	34·7	35·7	36·7	37·7	38·8	39·8	40·8	41·8	42·8	43·8	44·8
41·0	5	24·1	25·3	26·5	27·7	28·9	30·1	31·2	32·3	33·3	34·3	35·3	36·3	37·3	38·3	39·3	40·3	41·4	42·4	43·4	44·4
42·8	6	23·7	25	26·1	27·3	28·5	29·7	30·8	31·8	32·8	33·8	34·9	35·9	36·9	37·9	38·9	39·9	40·9	41·9	42·9	43·9
44·6	7	23·4	24·7	25·8	27	28·1	29·3	30·3	31·3	32·3	33·3	34·3	35·4	36·4	37·4	38·4	39·4	40·4	41·4	42·4	43·4
46·4	8	23	24·2	25·4	26·6	27·7	28·9	29·9	30·9	31·9	32·9	33·9	34·9	35·9	36·9	38	39	40	41	42	43
48·2	9	22·7	23·9	25	26·2	27·3	28·5	29·5	30·5	31·5	32·5	33·5	34·5	35·5	36·5	37·5	38·6	39·6	40·6	41·6	42·6
50·0	10	22·4	23·5	24·6	25·8	26·9	28	29·1	30·1	31·1	32·1	33·1	34·1	35·1	36·1	37·1	38·1	39·1	40·1	41·1	42·1
51·8	11	22·1	23·2	24·3	25·4	26·5	27·7	28·7	29·7	30·7	31·7	32·7	33·7	34·7	35·7	36·7	37·7	38·7	39·7	40·7	41·7
53·6	12	21·8	22·9	24	25·1	26·1	27·2	28·2	29·2	30·2	31·2	32·2	33·2	34·3	35·3	36·3	37·3	38·3	39·3	40·3	41·3
55·4	13	21·5	22·6	23·7	24·7	25·7	26·8	27·8	28·8	29·8	30·8	31·8	32·8	33·8	34·8	35·8	36·8	37·8	38·8	39·8	40·9
57·2	14	21·2	22·3	23·3	24·3	25·3	26·4	27·4	28·4	29·4	30·4	31·4	32·4	33·4	34·4	35·4	36·4	37·4	38·4	39·4	40·4
59·0	15	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
60·8	16	20·7	21·7	22·7	23·7	24·7	25·7	26·6	27·6	28·6	29·6	30·6	31·6	32·5	33·5	34·5	35·5	36·5	37·5	38·5	39·5
62·6	17	20·4	21·4	22·4	23·4	24·4	25·4	26·3	27·3	28·2	29·2	30·2	31·2	32·1	33·1	34·1	35·1	36·1	37·1	38·1	39·1
64·4	18	20·1	21·1	22	23	24	25	25·9	26·9	27·8	28·8	29·8	30·8	31·7	32·6	33·6	34·6	35·6	36·6	37·6	38·6
66·2	19	19·8	20·8	21·7	22·7	23·6	24·6	25·5	26·4	27·3	28·3	29·3	30·3	31·2	32·2	33·2	34·2	35·2	36·2	37·2	38·2
68·0	20	19·5	20·5	21·4	22·4	23·3	24·3	25·2	26·1	27	27·9	28·9	29·9	30·8	31·8	32·8	33·8	34·8	35·8	36·8	37·8
69·8	21	19·1	20·1	21·1	22·1	22·9	23·9	24·8	25·6	26·6	27·5	28·5	29·5	30·4	31·4	32·4	33·4	34·4	35·4	36·4	37·4
71·6	22	18·8	19·8	20·7	21·6	22·5	23·5	24·3	25·2	26·2	27·1	28·1	29·1	30	31	32	33	34	35	36	36·9
73·4	23	18·5	19·4	20·3	21·3	22·2	23·1	24	24·9	25·8	26·7	27·7	28·7	29·6	30·6	31·6	32·6	33·5	34·5	35·5	36·5
75·2	24	18·2	19·1	20	21	21·8	22·7	23·6	24·5	25·4	26·3	27·3	28·3	29·2	30·2	31·1	32·1	33·1	34·1	35·1	36·1

(Gay-Lussac.)—Table II.—*continued.*

Temp. F.	Temp. C.	21 per cent.	22 per cent.	23 per cent.	24 per cent.	25 per cent.	26 per cent.	27 per cent.	28 per cent.	29 per cent.	30 per cent.	31 per cent.	32 per cent.	33 per cent.	34 per cent.	35 per cent.	36 per cent.	37 per cent.	38 per cent.	39 per cent.	40 per cent.
		Observed percentage of the Alcoholometer.																			
77·0	25	17·9	18·8	19·7	20·6	21·5	22·4	23·2	24·2	25·1	26	26·9	27·9	28·8	29·7	30·7	31·7	32·7	33·7	34·7	35·7
78·8	26	17·6	18·5	19·4	20·3	21·2	22·1	22·9	23·8	24·7	25·6	26·5	27·5	28·4	29·3	30·3	31·3	32·3	33·3	34·3	35·3
80·6	27	17·3	18·2	19·1	20	20·8	21·7	22·6	23·5	24·3	25·2	26·1	27·1	27·9	28·9	29·9	30·9	31·9	32·9	33·9	34·8
82·4	28	16·9	17·9	18·8	19·6	20·5	21·4	22·2	23·1	23·9	24·8	25·7	26·6	27·5	28·5	29·5	30·5	31·5	32·5	33·5	34·4
84·2	29	16·6	17·5	18·4	19·3	20·2	21	21·8	22·7	23·6	24·4	25·2	26·2	27·1	28·1	29·1	30·1	31·1	32·1	33·1	34
86·0	30	16·3	17·2	18·1	19	19·8	20·7	21·5	22·4	23·2	24	24·9	25·8	26·7	27·7	28·7	29·7	30·7	31·6	32·6	33·6

Temp. F.	Temp. C.	41 per cent.	42 per cent.	43 per cent.	44 per cent.	45 per cent.	46 per cent.	47 per cent.	48 per cent.	49 per cent.	50 per cent.	51 per cent.	52 per cent.	53 per cent.	54 per cent.	55 per cent.	56 per cent.	57 per cent.	58 per cent.	59 per cent.	60 per cent.
32·0	0	47·4	48·4	49·3	50·3	51·3	52·3	53·2	54·1	55·1	56·1	57·1	58	59	59·9	60·9	61·9	62·9	63·9	64·9	65·8
33·8	1	47	48	48·9	49·9	50·8	51·8	52·8	53·7	54·7	55·7	56·7	57·6	58·6	59·6	60·6	61·6	62·5	63·5	64·5	65·5
35·6	2	46·5	47·5	48·5	49·5	50·4	51·4	52·3	53·3	54·3	55·3	56·3	57·2	58·2	59·2	60·2	61·2	62·1	63·1	64·1	65·1
37·4	3	46·2	47·1	48·1	49	50	51	52	52·9	53·9	54·8	55·8	56·8	57·8	58·8	59·8	60·8	61·7	62·7	63·7	64·7
39·2	4	45·8	46·7	47·7	48·7	49·6	50·6	51·5	52·5	53·5	54·5	55·5	56·5	57·4	58·4	59·4	60·3	61·3	62·3	63·3	64·3
41·0	5	45·3	46·2	47·2	48·2	49·2	50·2	51·1	52·1	53·1	54	55	56	57	58	59	60	60·9	61·9	62·9	63·9
42·8	6	44·9	45·8	46·8	47·8	48·8	49·8	50·8	51·7	52·7	53·7	54·7	55·6	56·6	57·5	58·5	59·5	60·5	61·5	62·5	63·5
44·6	7	44·4	45·4	46·4	47·4	48·4	49·4	50·4	51·3	52·3	53·2	54·2	55·2	56·2	57·1	58·1	59·1	60·1	61·1	62·1	63·1
46·4	8	44	45	46	47	47·9	48·9	49·9	50·9	51·9	52·9	53·9	54·9	55·8	56·8	57·8	58·8	59·8	60·8	61·8	62·8
48·2	9	43·6	44·6	45·6	46·6	47·5	48·5	49·5	50·5	51·5	52·5	53·5	54·5	55·5	56·4	57·4	58·4	59·4	60·4	61·4	62·4

(GAY-LUSSAC.)—TABLE II.—*continued.*

Temp. F.	Temp. C.	Observed percentage of the Alcoholometer. 41 per cent.	42 per cent.	43 per cent.	44 per cent.	45 per cent.	46 per cent.	47 per cent.	48 per cent.	49 per cent.	50 per cent.	51 per cent.	52 per cent.	53 per cent.	54 per cent.	55 per cent.	56 per cent	57 per cent.	58 per cent.	59 per cent.	60 per cent.
50·0	10	43·1	44·1	45·1	46·1	47·1	48·1	49·1	50·1	51·1	52	53	54	55	56	57	58	59	60	61	62
51·8	11	42·7	43·7	44·7	45·7	46·7	47·7	48·7	49·7	50·7	51·7	52·7	53·7	54·6	55·6	56·6	57·6	58·6	59·6	60·6	61·6
53·6	12	42·3	43·3	44·3	45·3	46·3	47·3	48·3	49·3	50·3	51·2	52·2	53·2	54·2	55·2	56·2	57·2	58·2	59·2	60·2	61·2
55·4	13	41·9	42·9	43·9	44·9	45·9	46·9	47·9	48·9	49·9	50·9	51·9	52·8	53·8	54·8	55·8	56·8	57·8	58·8	59·8	60·8
57·2	14	41·4	42·4	43·4	44·4	45·4	46·4	47·4	48·4	49·4	50·4	51·4	52·4	53·4	54·4	55·4	56·4	57·4	58·4	59·4	60·4
59·0	15	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
60·8	16	40·6	41·6	42·6	43·6	44·6	45·6	46·6	47·6	48·6	49·6	50·6	51·6	52·6	53·6	54·6	55·6	56·6	57·6	58·6	59·6
62·6	17	40·1	41·1	42·1	43·1	44·1	45·2	46·2	47·2	48·2	49·2	50·2	51·2	52·2	53·2	54·2	55·2	56·2	57·2	58·2	59·2
64·4	18	39·7	40·7	41·7	42·7	43·7	44·8	45·8	46·8	47·8	48·8	49·8	50·8	51·8	52·8	53·8	54·8	55·8	56·8	57·8	58·8
66·2	19	39·3	40·3	41·3	42·4	43·4	44·4	45·4	46·4	47·4	48·4	49·4	50·4	51·4	52·4	53·4	54·4	55·4	56·4	57·4	58·4
68·0	20	38·9	39·9	40·9	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58
69·8	21	38·4	39·4	40·4	41·5	42·5	43·5	44·6	45·6	46·6	47·6	48·6	49·6	50·6	51·6	52·6	53·6	54·6	55·6	56·6	57·6
71·6	22	38	39	40	41·1	42·1	43·1	44·1	45·1	46·1	47·1	48·1	49·1	50·1	51·1	52·2	53·2	54·2	55·2	56·2	57·2
73·4	23	37·6	38·6	39·6	40·6	41·6	42·6	43·6	44·6	45·7	46·7	47·7	48·8	49·8	50·8	51·8	52·8	53·8	54·8	55·8	56·8
75·2	24	37·2	38·2	39·2	40·2	41·2	42·2	43·3	44·3	45·3	46·3	47·3	48·4	49·4	50·4	51·4	52·4	53·4	54·4	55·4	56·4
77·0	25	36·7	37·7	38·7	39·8	40·8	41·9	42·9	43·9	44·9	46	47	48	49	50	51	52	53	54	55	56
78·8	26	36·3	37·3	38·3	39·4	40·4	41·5	42·5	43·5	44·5	45·5	46·5	47·5	48·5	49·5	50·5	51·5	52·5	53·5	54·5	55·6
80·6	27	35·9	36·9	37·9	39	40	41·1	42·1	43·1	44·1	45·1	46·1	47·1	48·1	49·1	50·2	51·2	52·2	53·2	54·2	55·2
82·4	28	35·4	36·5	37·5	38·6	39·6	40·6	41·6	42·6	43·7	44·7	45·7	46·7	47·7	48·7	49·8	50·8	51·8	52·8	53·8	54·8
84·2	29	35	36	37·1	38·1	39·1	40·2	41·2	42·2	43·3	44·3	45·3	46·3	47·3	48·4	49·4	50·4	51·4	52·4	53·4	54·4
86·0	30	34·6	35·6	36·6	37·7	38·7	39·8	40·8	41·8	42·8	43·8	44·9	45·9	47	48	49	50	51	52	53	54

(GAY-LUSSAC.)—TABLE II.—*continued.*

Temp. F.	Temp. C.	Observed percentage of the Alcoholometer. 61 per cent.	62 per cent.	63 per cent.	64 per cent.	65 per cent.	66 per cent.	67 per cent.	68 per cent.	69 per cent.	70 per cent.	71 per cent.	72 per cent.	73 per cent.	74 per cent.	75 per cent.	76 per cent.	77 per cent.	78 per cent.	79 per cent.	80 per cent.
32·0	0	66·8	67·8	68·8	69·8	70·8	71·7	72·7	73·7	74·7	75·7	76·6	77·6	78·6	79·6	80·6	81·6	82·6	83·6	84·5	85·5
33·8	1	66·5	67·5	68·5	69·4	70·4	71·3	72·3	73·3	74·3	75·3	76·2	77·2	78·2	79·2	80·2	81·2	82·2	83·2	84·2	85·1
35·6	2	66·1	67·1	68·1	69·1	70·1	71	71·9	72·9	73·9	74·9	75·9	76·9	77·9	78·9	79·9	80·9	81·9	82·9	83·8	84·7
37·4	3	65·6	66·6	67·6	68·6	69·6	70·6	71·6	72·6	73·6	74·5	75·5	76·5	77·5	78·5	79·5	80·5	81·5	82·5	83·4	84·4
39·2	4	65·3	66·3	67·3	68·3	69·3	70·2	71·2	72·2	73·2	74·1	75·1	76·1	77·1	78·1	79·1	80·1	81·1	82·1	83	84
41·0	5	64·9	65·9	66·9	67·9	68·9	69·8	70·8	71·8	72·8	73·8	74·8	75·7	76·7	77·7	78·7	79·7	80·7	81·7	82·7	83·7
42·8	6	64·5	65·5	66·5	67·5	68·5	69·5	70·5	71·5	72·5	73·4	74·4	75·3	76·3	77·3	78·3	79·3	80·3	81·3	82·3	83·3
44·6	7	64·1	65·1	66·1	67·1	68·1	69·1	70·1	71·1	72	73	74	75	76	77	78	79	80	81	82	82·9
46·4	8	63·8	64·8	65·8	66·8	67·7	68·7	69·7	70·6	71·6	72·6	73·6	74·6	75·6	76·6	77·6	78·6	79·6	80·6	81·6	82·6
48·2	9	63·4	64·4	65·4	66·4	67·3	68·3	69·3	70·3	71·3	72·3	73·3	74·2	75·2	76·2	77·2	78·2	79·2	80·2	81·2	82·2
50·0	10	63	64	65	66	67	67·9	68·9	69·9	70·9	71·9	72·9	73·9	74·9	75·9	76·9	77·9	78·9	79·9	80·9	81·9
51·8	11	62·6	63·6	64·6	65·6	66·6	67·6	68·6	69·6	70·6	71·6	72·6	73·5	74·5	75·5	76·5	77·5	78·5	79·5	80·5	81·5
53·6	12	62·2	63·2	64·2	65·2	66·2	67·2	68·2	69·2	70·2	71·2	72·2	73·1	74·1	75·1	76·1	77·1	78·1	79·1	80·1	81·1
55·4	13	61·8	62·8	63·8	64·8	65·8	66·8	67·8	68·8	69·8	70·8	71·8	72·8	73·8	74·8	75·8	76·8	77·8	78·8	79·8	80·8
57·2	14	61·4	62·4	63·4	64·4	65·4	66·4	67·4	68·4	69·4	70·4	71·4	72·4	73·4	74·4	75·4	76·4	77·4	78·4	79·4	80·4
59·0	15	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
60·8	16	60·6	61·6	62·6	63·6	64·6	65·6	66·6	67·6	68·6	69·6	70·6	71·6	72·6	73·6	74·6	75·6	76·6	77·6	78·6	79·6
62·6	17	60·2	61·2	62·2	63·2	64·2	65·2	66·3	67·2	68·2	69·2	70·2	71·2	72·2	73·2	74·2	75·2	76·2	77·2	78·2	79·2
64·4	18	59·8	60·8	61·8	62·8	63·8	64·8	65·8	66·8	67·8	68·8	69·8	70·8	71·8	72·8	73·8	74·9	75·9	76·9	77·9	78·9
66·2	19	59·4	60·4	61·4	62·5	63·5	64·5	65·5	66·5	67·5	68·5	69·5	70·5	71·5	72·5	73·5	74·5	75·5	76·5	77·5	78·5
68·0	20	59	60	61	62	63	64	65·1	66·1	67·1	68·1	69·1	70·1	71·1	72·1	73·1	74·1	75·1	76·1	77·1	78·1
69·8	21	58·6	59·6	60·7	61·7	62·7	63·7	64·7	65·7	66·7	67·7	68·7	69·7	70·7	71·7	72·7	73·7	74·7	75·8	76·8	77·8

(GAY-LUSSAC.)—TABLE II.—*continued.*

Temp.		Observed percentage of the Alcoholometer.																			
F.	C.	61 per cent.	62 per cent.	63 per cent.	64 per cent.	65 per cent.	66 per cent.	67 per cent.	68 per cent.	69 per cent.	70 per cent.	71 per cent.	72 per cent.	73 per cent.	74 per cent.	75 per cent.	76 per cent.	77 per cent.	78 per cent.	79 per cent.	80 per cent.
71·6	22	58·2	59·2	60·3	61·3	62·3	63·3	64·3	65·3	66·3	67·3	68·3	69·3	70·3	71·3	72·3	73·3	74·3	75·4	76·4	77·4
73·4	23	57·8	58·8	59·8	60·9	61·9	62·9	63·9	64·9	65·9	66·9	67·9	68·9	70	71	72	73	74	75	76	77
75·2	24	57·4	58·4	59·4	60·5	61·5	62·5	63·5	64·5	65·5	66·5	67·5	68·5	69·6	70·6	71·6	72·6	73·6	74·6	75·6	76·6
77·0	25	57	58	59	60·1	61·1	62·1	63·1	64·1	65·1	66·1	67·1	68·1	69·2	70·2	71·2	72·2	73·2	74·2	75·3	76·3
78·8	26	56·6	57·6	58·6	59·6	60·7	61·7	62·7	63·7	64·7	65·7	66·7	67·7	68·8	69·8	70·8	71·8	72·8	73·8	74·8	75·9
80·6	27	56·2	57·2	58·3	59·3	60·3	61·3	62·3	63·3	64·3	65·3	66·3	67·3	68·4	69·4	70·4	71·4	72·4	73·4	74·4	75·5
82·4	28	55·8	56·8	57·8	58·8	59·9	60·9	61·9	62·9	63·9	64·9	66	67	68	69·1	70·1	71·1	72·1	73·1	74·1	75·1
84·2	29	55·4	56·4	57·4	58·5	59·5	60·5	61·5	62·5	63·5	64·5	65·6	66·6	67·7	68·7	69·7	70·7	71·7	72·7	73·7	74·7
86·0	30	55	56	57·1	58·1	59·1	60·1	61·1	62·1	63·1	64·1	65·2	66·2	67·3	68·3	69·3	70·3	71·3	72·3	73·3	74·3

Temp. F.	C.	81 per cent.	82 per cent.	83 per cent.	84 per cent.	85 per cent.	86 per cent.	87 per cent.	88 per cent.	89 per cent.	90 per cent.	91 per cent.	92 per cent.	93 per cent.	94 per cent.	95 per cent.	96 per cent.	97 per cent.	98 per cent.	99 per cent.	100 per cent.
32·0	0	86·4	87·4	88·3	89·2	90·2	91·2	92·2	93·1	94	95	95·9	96·8	97·7	98·6	99·5	100·3	101·2			
33·8	1	86·1	87	88	89	89·9	90·8	91·8	92·8	93·7	94·6	95·6	96·5	97·4	98·3	99·2	100	100·9			
35·6	2	85·7	86·6	87·6	88·6	89·6	90·5	91·5	92·4	93·4	94·3	95·2	96·1	97	97·9	98·9	99·8	100·7			
37·4	3	85·3	86·3	87·3	88·3	89·2	90·2	91·2	92·1	93	94	94·9	95·8	96·7	97·7	98·6	99·5	100·4			
39·2	4	85	86	87	88	88·9	89·9	90·8	91·8	92·7	93·7	94·6	95·5	96·4	97·4	98·3	99·2	100·1	101		
41·0	5	84·7	85·6	86·6	87·6	88·5	89·5	90·5	91·4	92·4	93·3	94·3	95·2	96·2	97·1	98	98·9	99·8	100·7		
42·8	6	84·3	85·3	86·3	87·3	88·2	89·2	90·1	91	92	93	93·9	94·9	95·9	96·8	97·7	98·7	99·6	100·5		
44·6	7	83·9	84·9	85·9	86·9	87·9	88·8	89·8	90·7	91·7	92·6	93·6	94·6	95·6	96·5	97·4	98·4	99·3	100·2		

(GAY-LUSSAC.)—TABLE II.—*continued.*

Temp. F.	Temp. C.	Observed percentage of the Alcoholometer.																			
		81 per cent.	82 per cent.	83 per cent.	84 per cent.	85 per cent.	86 per cent.	87 per cent.	88 per cent.	89 per cent.	90 per cent.	91 per cent.	92 per cent.	93 per cent.	94 per cent.	95 per cent.	96 per cent.	97 per cent.	98 per cent.	99 per cent.	100 per cent.
46·4	8	83·6	84·6	85·6	86·5	87·5	88·5	89·4	90·4	91·3	92·3	93·3	94·3	95·3	96·2	97·1	98·1	99	99·9		
48·2	9	83·2	84·2	85·2	86·2	87·1	88·1	89·1	90	91	92	93	94	95	95·9	96·8	97·8	98·7	99·7	100	
50·0	10	82·8	83·8	84·8	85·8	86·8	87·8	88·7	89·7	90·7	91·7	92·7	93·7	94·7	95·6	96·5	97·5	98·5	99·4	100·4	
51·8	11	82·5	83·4	84·4	85·4	86·4	87·4	88·4	89·4	90·4	91·4	92·4	93·3	94·3	95·3	96·2	97·2	98·2	99·1	100·1	
53·6	12	82·1	83·1	84·1	85	86	87	88	89	90	91	92	93	94	95	95·9	96·9	97·9	98·9	99·8	
55·4	13	81·8	82·8	83·8	84·8	85·7	86·7	87·7	88·7	89·7	90·7	91·7	92·7	93·7	94·6	95·6	96·6	97·6	98·6	99·5	
57·2	14	81·4	82·4	83·4	84·4	85·4	86·4	87·4	88·3	89·3	90·3	91·3	92·3	93·3	94·3	95·3	96·3	97·3	98·3	99·3	
59·0	15	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
60·8	16	80·6	81·6	82·6	83·6	84·6	85·6	86·6	87·6	88·6	89·6	90·7	91·7	92·7	93·7	94·7	95·7	96·7	97·7	98·7	99·7
62·6	17	80·2	81·2	82·2	83·2	84·2	85·2	86·2	87·2	88·2	89·3	90·3	91·3	92·4	93·4	94·4	95·4	96·4	97·4	98·5	99·5
64·4	18	79·9	80·9	81·9	82·9	83·9	84·9	85·9	86·9	87·9	88·9	89·9	91	92	93	94	95·1	96·1	97·1	98·2	99·2
66·2	19	79·5	80·5	81·6	82·6	83·6	84·6	85·6	86·6	87·6	88·6	89·6	90·7	91·7	92·7	93·7	94·8	95·8	96·9	97·9	98·9
68·0	20	79·1	80·1	81·2	82·2	83·2	84·2	85·2	86·2	87·2	88·2	89·2	90·3	91·3	92·4	93·4	94·5	95·5	96·6	97·6	98·6
69·8	21	78·7	79·7	80·8	81·8	82·8	83·8	84·8	85·9	86·9	87·9	88·9	90	91	92	93·1	94·1	95·2	96·3	97·3	98·4
71·6	22	78·4	79·4	80·4	81·4	82·4	83·4	84·4	85·5	86·5	87·6	88·6	89·6	90·7	91·8	92·8	93·9	94·9	96	97	98·1
73·4	23	78	79	80·1	81·1	82·1	83·1	84·1	85·1	86·1	87·2	88·3	89·3	90·4	91·4	92·4	93·5	94·6	95·7	96·7	97·8
75·2	24	77·6	78·6	79·7	80·7	81·7	82·7	83·7	84·7	85·7	86·8	87·9	88·9	90	91·1	92·1	93·2	94·3	95·3	96·4	97·5
77·0	25	77·3	78·3	79·3	80·3	81·3	82·3	83·4	84·4	85·4	86·5	87·5	88·6	89·7	90·7	91·8	92·9	93·9	95	96·1	97·2
78·8	26	76·9	77·9	78·9	79·9	80·9	81·9	82·9	84	85	86·1	87·2	88·2	89·3	90·4	91·5	92·5	93·6	94·7	95·8	97
80·6	27	76·5	77·5	78·5	79·5	80·5	81·6	82·6	83·6	84·7	85·7	86·8	87·9	89	90	91·1	92·2	93·3	94·3	95·5	96·7
82·4	28	76·1	77·1	78·2	79·2	80·2	81·3	82·3	83·3	84·3	85·4	86·5	87·5	88·6	89·7	90·8	91·9	93	94·1	95·2	96·4
84·2	29	75·7	76·8	77·8	78·8	79·8	80·9	81·6	83	84	85	86·1	87·2	88·2	89·3	90·4	91·6	92·7	93·8	94·9	96·1
86·0	30	75·3	76·4	77·4	78·4	79·4	80·5	81·5	82·6	83·6	84·7	85·8	86·9	87·9	89	90·1	91·2	92·4	93·5	94·6	95·8

TABLE I.

Table of Specific Gravities by Sikes' Hydrometer, adapted to Field's Alcoholometer for Cordialized Spirits.

Temperature, 60°.—Specific Gravity of Water, 1·000°.

60		70		80		90		100		110		120	
Wt.	S.G.	Wt.	S.G.	Wt.	S.G.	Wt.	S.G.	Wt.	S.G.	Wt.	S.G.	Wt.	S.G.
60	922	70	942	80	961	90	981	100	1000	110	1020	120	1041
1	924	1	943	1	963	1	983	1	1002	1	1022	1	1044
2	926	2	945	2	965	2	985	2	1004	2	1024	2	1046
3	928	3	947	3	967	3	987	3	1006	3	1026	3	1048
4	930	4	949	4	969	4	989	4	1008	4	1029	4	1050
5	932	5	951	5	971	5	991	5	1010	5	1031	5	1052
6	934	6	953	6	973	6	993	6	1012	6	1033	6	1054
7	936	7	955	7	975	7	995	7	1014	7	1035	7	1056
8	938	8	957	8	977	8	997	8	1016	8	1037	8	1058
9	940	9	959	9	979	9	999	9	1018	9	1039	9	1061
70	942	80	961	90	981	100	1000	110	1020	120	1041	130	1063

130		140		150		160		170		180	
Wt.	S.G.	Wt.	S.G.	Wt.	S.G.	Wt.	S.G.	Wt.	S.G.	Wt.	S.G.
130	1063	140	1085	150	1107	160	1129	170	1152	180	1175
1	1065	1	1087	1	1109	1	1131	1	1155	1	1178
2	1067	2	1089	2	1111	2	1134	2	1157	2	1180
3	1069	3	1091	3	1113	3	1136	3	1159	3	1182
4	1071	4	1093	4	1116	4	1139	4	1162	4	1185
5	1074	5	1096	5	1118	5	1141	5	1164	5	1187
6	1076	6	1098	6	1120	6	1143	6	1166	6	1189
7	1078	7	1100	7	1123	7	1145	7	1168	7	1191
8	1080	8	1102	8	1125	8	1148	8	1171	8	1194
9	1082	9	1104	9	1127	9	1150	9	1173	9	1196
140	1085	150	1107	160	1129	170	1152	180	1175	190	1199

TABLE II.

Table showing the Lbs. of Sugar per Gallon in Cordialized Spirits, with the Percentages to be added to the Indicated Strength, per the Alcoholometer.

Difference of Gravity. Lbs. of Sugar per Gallon.		10	15	20	25	30	35	40	45	50	Difference of Gravity. Lbs. of Sugar per Gallon.	
Spec. Grav. of Spirit.	Per cent. of Spirit.	4 oz., or 25 to 100.	6 oz., $37\frac{1}{2}$ to 100.	8 oz., 50 to 100.	10 oz., $62\frac{1}{2}$ to 100.	12 oz., 75 to 100.	14 oz., $87\frac{1}{2}$ to 100.	1·0.	oz. 1·2.	oz. 1·2.	Per cent. of Spirit.	Spec. Grav. of Spirit.
920	Proof	1·6	2·5	3·4	4·4	5·3	6·2	7·1	8·1	9·0	Proof	920
923	2·5	1·6	2·5	3·3	4·3	5·2	6·1	6·9	7·8	8·8	2·5	923
926	5·	1·5	2·4	3·2	4·2	5·0	5·9	6·8	7·7	8·6	5·	926
929	7·5	1·5	2·3	3·2	4·1	4·9	5·8	6·6	7·5	8·4	7·5	929
932	10·	1·4	2·2	3·1	4·0	4·8	5·7	6·5	7·4	8·2	10·	932
935	12·5	1·4	2·2	3·1	3·9	4·7	5·5	6·3	7·2	8·0	12·5	935
938	15·	1·4	2·1	3·0	3·8	4·6	5·4	6·2	7·0	7·8	15·	938
940	17·5	1·3	2·1	2·9	3·7	4·5	5·3	6·0	6·8	7·6	17·5	940
943	20·	1·3	2·0	2·8	3·6	4·4	5·2	5·9	6·7	7·5	20·	943
945	22·5	1·3	2·0	2·7	3·5	4·3	5·0	5·7	6·5	7·3	22·5	945
948	25·	1·2	1·9	2·6	3·4	4·1	4·8	5·5	6·3	7·0	25·	948
950	27·5	1·2	1·9	2·5	3·3	4·0	4·7	5·3	6·1	6·8	27·5	950
952	30·	1·1	1·8	2·4	3·1	3·8	4·5	5·1	5·8	6·5	30·	952
954	32·5	1·1	1·7	2·3	3·0	3·6	4·3	4·8	5·5	6·2	32·5	954
956	35·	1·0	1·6	2·2	2·9	3·5	4·1	4·6	5·3	6·0	35·	956
958	37·5	1·0	1·6	2·1	2·8	3·4	3·9	4·4	5·1	5·8	37·5	958
960	40·	·9	1·5	2·0	2·7	3·2	3·8	4·3	4·9	5·5	40·	960
962	42·5	·9	1·5	2·0	2·6	3·1	3·6	4·1	4·7	5·3	42·5	962
964	45·	·9	1·4	1·9	2·5	3·0	3·5	4·0	4·6	5·1	45·	964

TABLE II.—*continued.*

Difference of Gravity. Lbs. of Sugar per Gallon.		10	15	20	25	30	35	40	45	50	Difference of Gravity. Lbs. of Sugar per Gallon.	
Spec. Grav. of Spirit.	Per cent. of Spirit.	4 oz., or 25 to 100.	6 oz., 37⅛ to 100.	8 oz., 50 to 100.	10 oz., 62½ to 100.	12 oz., 75 to 100.	14 oz., 87½ to 100.	1·0.	oz. 1·2.	oz. 1·4.	Per cent. of Spirit.	Spec. Grav. of Spirit.
965	47·5	·8	1·4	1·9	2·4	2·9	3·4	3·9	4·4	4·9	47·5	965
967	50·	·8	1·3	1·8	2·3	2·8	3·3	3·8	4·3	4·8	50·	967
969	52·5	·7	1·2	1·7	2·2	2·6	3·1	3·6	4·1	4·5	52·5	969
970	55·	·7	1·2	1·6	2·0	2·4	2·9	3·4	3·8	4·2	55·	970
972	57·5	·6	1·1	1·5	1·9	2·2	2·7	3·1	3·5	3·9	57·5	972
973	60·	·6	1·0	1·4	1·8	2·1	2·5	2·9	3·3	3·6	60·	973
974	62·5	·6	1·0	1·3	1·7	2·0	2·4	2·7	3·1	3·5	62·5	974
976	65·	·5	·9	1·2	1·5	1·8	2·2	2·5	2·8	3·1	65·	976
977	67·5	·5	·8	1·1	1·4	1·7	2·0	2·3	2·6	2·9	67·5	977
979	70·	·4	·7	1·0	1·3	1·5	1·8	2·1	2·4	2·6	70·	979
980	72·5	·4	·7	·9	1·1	1·3	1·6	1·9	2·1	2·3	72·5	980
982	75·	·3	·6	·8	1·0	1·2	1·4	1·6	1·8	2·0	75·	982
983	77·5	·3	·5	·7	·9	1·0	1·2	1·4	1·6	1·8	77·5	983
984	80·	·2	·4	·6	·8	·9	1·0	1·2	1·4	1·6	80·	984
986	82·5	·2	·3	·5	·7	·8	·9	1·0	1·2	1·4	82·5	986
988	85·	·2	·2	·4	·6	·7	·8	·9	1·0	1·2	85·	988
990	87·5	·1	·2	·3	·5	·6	·7	·8	·9	1·0	87·5	990
992	90·	·1	·1	·2	·4	·5	·6	·7	·8	·9	90·	992
994	92·5	..	·1	·2	·3	·4	·5	·6	·7	·8	92·5	994
996	95·	..	..	·1	·2	·3	·4	·5	·6	·7	95·	996
998	97·5	..	..	..	·1	·2	·3	·4	·5	·6	97·5	998

Table showing the Strength of Sugar Solutions by Specific Gravity at 17·5° C

Sugar per cent.	Specific Gravity according to		Sugar per cent.	Specific Gravity according to	
	Balling.	Niemann.		Balling.	Niemann.
1	1·0040	1·0035	19	1·0788	1·0784
2	1·0080	1·0070	20	1·0832	1·0830
3	1·0120	1·0106	21	1·0877	1·0875
4	1·0160	1·0143	22	1·0922	1·0920
5	1·0200	1·0179	23	1·0967	1·0965
6	1·0240	1·0215	24	1·1013	1·1010
7	1·0281	1·0254	25	1·1059	1·1056
8	1·0322	1·0291	26	1·1106	1·1103
9	1·0363	1·0328	27	1·1153	1 1150
10	1·0404	1·0367	28	1·1200	1·1197
11	1·0446	1·0410	29	1·1247	1·1245
12	1·0488	1·0456	30	1·1295	1·1293
13	1·0530	1·0504	31	1·1343	1·1340
14	1·0572	1·0552	32	1·1391	1·1388
15	1·0614	1·0600	33	1·1440	1·1436
16	1·0657	1·0647	34	1·1490	1·1484
17	1·0700	1·0693	35	1·1540	1·1533
18	1·0744	1·0738	36	1·1590	1·1582

TABLE SHOWING THE STRENGTH OF SUGAR SOLUTIONS, &c.—*continued.*

Sugar per cent.	Specific Gravity according to Balling.	Specific Gravity according to Niemann.	Sugar per cent.	Specific Gravity according to Balling.	Specific Gravity according to Niemann.
37	1·1641	1·1631	56	1·2667	1·2658
38	1·1692	1·1681	57	1·2725	1·2714
39	1·1743	1·1731	58	1·2783	1·2770
40	1·1794	1·1781	59	1·2841	1·2826
41	1·1846	1·1832	60	1·2900	1 2882
42	1·1898	1·1883	61	1·2959	1·2938
43	1·1951	1·1935	62	1·3019	1·2994
44	1·2004	1·1989	63	1 3079	1·3050
45	1·2057	1·2043	64	1·3139	1·3105
46	1·2111	1·2098	65	1·3190	1·3160
47	1·2165	1·2153	66	1·3260	1·3215
48	1 2219	1·2209	67	1·3321	1·3270
49	1·2274	1·2265	68	1·3383	1·3324
50	1·2329	1·2322	69	1·3445	1·3377
51	1·2385	1·2378	70	1·3507	1·3430
52	1·2441	1·2434	71	1·3570	1·3483
53	1·2479	1·2490	72	1·3633	1·3535
54	1·2553	1·2546	73	1·3696	1·3587
55	1·2610	1·2602	74	1·3760	1·3658

TABLE BY DR. URE, SHOWING THE QUANTITY OF SUGAR IN POUNDS AVOIRDUPOIS CONTAINED AT SUCCESSIVE DEGREES OF SPECIFIC GRAVITY, AT 60° FAHR. (15·5° C.).

Spec. Grav.	Lbs. per Gallon.	Spec. Grav.	Lbs. per Gallon.	Spec. Grav.	Lbs. per Gallon.	Spec. Grav.	Lbs. per Gallon.
1·000	0·0000	1·037	0·9449	1·074	1·9385	1·111	2·9263
1·001	0·0255	1·038	0·9768	1·075	1·9653	1·112	2·9522
1·002	0·0510	1·039	1·0090	1·076	1·9928	1·113	2·9780
1·003	0·0765	1·040	1·0400	1·077	2·1097	1·114	3·0045
1·004	0·1020	1·041	1·0653	1·078	2·0465	1·115	3·0304
1·005	0·1275	1·042	1·0906	1·079	2·0734	1·116	3·0563
1·006	0·1530	1·043	1·1159	1·080	2·1006	1·117	3·0821
1·007	0·1785	1·044	1·1412	1·081	2·1275	1·118	3·1080
1·008	0·2040	1·045	1·1665	1·082	2·1543	1·119	3·1343
1·009	0·2295	1·046	1·1918	1·083	2·1811	1·120	3·1610
1·010	0·2550	1·047	1·2171	1·084	2·2080	1·121	3·1871
1·011	0·2805	1·048	1·2424	1·085	2·2359	1·122	3·2130
1·012	0·3060	1·049	1·2687	1·086	2·2627	1·123	3·2399
1·013	0·3315	1·050	1·2940	1·087	2·2894	1·124	3·2658
1·014	0·3570	1·051	1·3206	1·088	2·3161	1·125	3·2916
1·015	0·3825	1·052	1·3472	1·089	2·3438	1·126	3·3174
1·016	0·4180	1·053	1·3738	1·090	2·3710	1·127	3·3431
1·017	0·4335	1·054	1·4004	1·091	2·3987	1·128	3·3690
1·018	0·4590	1·055	1·4270	1·092	2·4256	1·129	3·3949
1·019	0·4845	1·056	1·4536	1·093	2·4524	1·130	3·4211
1·020	0·5100	1·057	1·4802	1·094	2·4792	1·131	3·4490
1·021	0·5351	1·058	1·5068	1·095	2·5061	1·132	3·4769
1·022	0·5602	1·059	1·5334	1·096	2·5329	1·133	3·5048
1·023	0·5853	1·060	1·5600	1·097	2·5598	1·134	3·5326
1·024	0·6104	1·061	1·5870	1·098	2·5866	1·135	3·5605
1·025	0·6355	1·062	1·6142	1·099	2·6130	1·136	3·5882
1·026	0·6606	1·063	1·6414	1·100	2·6404	1·137	3·6160
1·027	0·6857	1·064	1·6688	1·101	2·6663	1·138	3·6437
1·028	0·7108	1·065	1·6959	1·102	2·6921	1·139	3·6716
1·029	0·7359	1·066	1·7228	1·103	2·7188	1·140	3·7000
1·030	0·7610	1·067	1·7496	1·104	2·7446	1·141	3·7281
1·031	0·7861	1·068	1·7764	1·105	2·7704	1·142	3·7562
1·032	0·8112	1·069	1·8033	1·106	2·7961	1·143	3·7840
1·033	0·8363	1·070	1·8300	1·107	2·8227	1·144	3·8118
1·034	0·8614	1·071	1·8571	1·108	2·8485	1·145	3·8398
1·035	0·8866	1·072	1·8843	1·109	2·8740	1·146	3·8677
1·036	0·9149	1·073	1·9116	1·110	2·9001	1·147	3·8955

TABLE BY DR. URE, SHOWING THE QUANTITY OF SUGAR IN POUNDS AVOIRDUPOIS, &c.—*continued.*

Spec. Grav.	Lbs. per Gallon.	Spec. Grav.	Lbs. per Gallon.	Spec. Grav.	Lbs. per Gallon.	Spec. Grav.	Lbs. per Gallon.
1·148	3·9235	1·187	4·9552	1·225	5·9801	1·263	7·0133
1·149	3·9516	1·188	4·9803	1·226	6·0081	1·264	7·0444
1·150	3·9801	1·189	5·0054	1·227	6·0361	1·265	7·0751
1·151	4·0070	1·190	5·0304	1·228	6·0642	1·266	7·1060
1·152	4·0342	1·191	5·0563	1·229	6·0925	1·267	7·1369
1·153	4·0611	1·192	5·0822	1·230	6·1205	1·268	7·1678
1·154	4·0880	1·193	5·1080	1·231	6·1474	1·269	7·1988
1·155	4·1148	1·194	5·1341	1·232	6·1743	1·270	7·2300
1·156	4·1319	1·195	5·1602	1·233	6·2012	1·271	7·2601
1·157	4·1588	1·196	5·1863	1·234	6·2280	1·272	7·2902
1·158	4·1857	1·197	5·2124	1·235	6·2551	1·273	7·3204
1·159	4·2128	1·198	5·2381	1·236	6·2822	1·274	7·3506
1·160	4·2502	1·199	5·2639	1·237	6·3093	1·275	7·3807
1·161	4·2771	1·200	5·2901	1·238	6·3362	1·276	7·4109
1·162	4·3040	1·201	5·3160	1·239	6·3631	1·277	7·4409
1·163	4·3309	1·202	5·3422	1·240	6·3903	1·278	7·4708
1·164	4·3578	1·203	5·3681	1·241	6·4152	1·279	7·5007
1·165	4·3847	1·204	5·3941	1·242	6·4401	1·280	7·5307
1·166	4·4115	1·205	5·4203	1·243	6·4650	1·281	7·5600
1·167	4·4383	1·206	5·4462	1·244	6·4902	1·282	7·5891
1·168	4·4652	1·207	5·4720	1·245	6·5153	1·283	7·6180
1·169	4·4923	1·208	5·4979	1·246	6·5402	1·284	7·6469
1·170	4·5201	1·209	5·5239	1·247	6·5651	1·285	7·6758
1·171	4·5460	1·210	5·5506	1·248	6·5903	1·286	7·7048
1·172	4·5722	1·211	5·5786	1·249	6·6152	1·287	7·7331
1·173	4·5983	1·212	5·6071	1·250	6·6402	1·288	7·7620
1·174	4·6242	1·213	5·6360	1·251	6·6681	1·289	7·7910
1·175	4·6505	1·214	5·6651	1·252	6·6960	1·290	7·8201
1·176	4·6764	1·215	5·6942	1·253	6·7240	1·291	7·8482
1·177	4·7023	1·216	5·7233	1·254	6·7521	1·292	7·8763
1·178	4·7281	1·217	5·7522	1·255	6·7800	1·293	7·9012
1·179	4·7539	1·218	5·7814	1·256	6·8081	1·294	7·9321
1·180	4·7802	1·219	5·8108	1·257	6·8362	1·295	7·9600
1·181	4·8051	1·220	5·8401	1·258	6·8643	1·296	7·9879
1·182	4·8303	1·221	5·8680	1·259	6·8921	1·297	8·0150
1·183	4·8554	1·222	5·8962	1·260	6·9201	1·298	8·0448
1·184	4·8802	1·223	5·9242	1·261	6·9510	1·299	8·0719
1·185	4·9051	1·224	5·9523	1·262	6·9822	1·300	8·1001
1·186	4·9300						

TABLE SHOWING THE STRENGTH OF SUGAR SOLUTIONS BY THE DEGREES OF BEAUMÉ'S HYDROMETER.

Beaumé Degrees.	Sugar per cent.	Beaumé Degrees.	Sugar per cent.
1	1·72	21	38·29
2	3·50	22	40·17
3	5·30	23	42·03
4	7·09	24	43·92
5	8·90	25	45·79
6	10·71	26	47·70
7	12·52	27	49·60
8	14·38	28	51·50
9	16·20	29	53·42
10	18·04	30	55·36
11	19·88	31	57·31
12	21·71	32	59·27
13	23·54	33	61·23
14	25·34	34	63·18
15	27·25	35	65·19
16	29·06	36	67·19
17	30·89	37	69·19
18	32·75	38	71·22
19	34·60	39	73·28
20	36·40	40	75·35

Use of Laurent's Saccharimeter.

Weigh 16·2 grams of the sugar, dissolve to 100 c. c., and add 10 c. c. of basic acetate of lead if necessary.

The 20 centimetre tube is used, or the 22 centimetre tube if the basic acetate has been added. The percentage of saccharose is given by the degrees of the instrument, the quantity of sugar per litre by the following Table:—

Divisions.	Sugar per Litre.	Divisions.	Sugar per Litre.
1	1·62 grams.	6	9·72 grams.
2	3·24 "	7	11·34 "
3	4·86 "	8	12·96 "
4	6·48 "	9	14·55 "
5	8·10 "		

If it is necessary to invert, A being the sum or difference of the observed degrees, and T the temperature °C.,

$$P \text{ (rotative power)} = \frac{200 \times A}{288 - T}; \quad P \times 1{\cdot}62 = \text{sugar per litre.}$$

Use of Soleil's Saccharimeter.

Dissolve 16·35 grams of the sugar in 60 c. c. of water, remove colouring matter if present by adding 2 or 3 c. c. of basic acetate of lead, dilute to 100 c. c. and filter if necessary. The 20 centimetre tube is used. The observed degrees give the percentage of crystallizable sugar, in the absence of other active substances. If other sugars are present, invert by adding 5 c. c. of pure fuming hydrochloric acid to the substance dissolved to 50 c. c. The whole is heated to 68° C. in the water bath and cooled. The 22 centimetre tube should be used; if the other is used, the indications must be multiplied by $\frac{11}{10}$. Clerget's Table (p. 368) is used.

Boussingault's Solution (*for Sugar*).—Dissolve 40 grams copper sulphate (crys.) in 200 c. c. of water. Take 160 grams of neutral potassium tartrate and 130 grams of fused sodium hydrate, and dissolve in 600 c. c. of water. Mix the two solutions, dilute to 1 litre, and boil for some minutes. This solution is unalterable. The ingredients must be pure.

Basic Acetate of Lead.—Dissolve 50 grams of lead acetate in 900 c. c. of water, and digest for 10 hours with 50 grams litharge.

TABLE FOR THE DETERMINATION OF THE VALUE IN SUGAR OF BEETROOT JUICE AND OTHER LIQUIDS BY MEANS OF THE POLARIMETER OF FRÈZE OR THE APPARATUS OF LAURENT.

Observed Degrees, 20 c.c. Tube.	Corrected Degrees for 22 c.c. Tube.	Grams of Sugar per 100 c.c. of Solution.	Specific Gravity of Solution.	Grams of Sugar per 100 grams of Liquid.	Observed Degrees, 20 c.c. Tube.	Corrected Degrees for 22 c.c. Tube.	Grams of Sugar per 100 c.c. of Solution.	Specific Gravity of Solution.	Grams of Sugar per 100 grams of Liquid.
8	8·8	6·6	1·0255	6·44	16	17·60	13·20	1·0509	12·56
8·25	9·07	6·8	·0263	6·63	16·25	17·87	13·40	·0517	12·74
8·50	9·35	7·01	·0271	6·83	16·50	18·15	13·61	·0524	12·93
8·75	9·62	7·22	·0279	7·02	16·75	18·42	13·82	·0533	13·12
9	9·90	7·43	·0287	7·22	17	18·70	14·03	·0541	13·31
9·25	10·17	7·63	·0295	7·41	17·25	18·97	14·23	·0548	13·49
9·50	10·45	7·84	·0303	7·61	17·50	19·25	14·44	·0556	13·68
9·75	10·72	8·04	·0311	7·80	17·75	19·52	14·64	·0564	13·86
10	11·00	8·25	·0319	7 99	18	19·80	14·85	·0572	14·04
10·25	11·27	8·45	·0326	8·18	18·25	20·07	15·05	·0580	14·23
10·50	11·55	8·66	·0335	8·38	18·50	20·35	15·26	·0588	14·41
10·75	11·82	8·87	·0343	8·58	18·75	20·62	15·47	·0596	14·60
11	12·10	9·08	·0351	8·77	19	20·90	15·68	·0604	14·79
11·25	12·37	9·28	·0358	8·96	19·25	21·17	15·88	·0611	14·97
11·50	12·65	9·49	·0366	9·15	19·50	21·45	16·09	·0619	15·15
11 75	12·92	9·69	·0374	9·34	19·75	21·72	16·29	·0627	15·33
12	13·20	9·90	·0382	9·54	20	22·00	16·50	·0635	15·51
12·25	13·47	10·10	·0390	9·72	20·25	22·27	16·70	·0643	15·69
12·50	13·75	10·31	·0398	9·92	20·50	22 55	16·91	·0651	15·88
12·75	14·02	10·52	·0406	10·11	20·75	22·82	17·12	·0660	16·06
13	14·30	10·73	·0414	10·30	21	23·10	17·33	·0667	16·24
13·25	14·57	10·93	·0422	10·49	21·25	23·37	17·53	·0674	16·42
13·50	14·85	11·14	·0431	10·68	21·50	23·65	17·74	·0682	16·61
13·75	15·12	11·34	·0438	10·86	21·75	23·92	17·94	·0690	16·78
14	15·40	11·55	·0445	11·06	22	24·20	18·15	·0698	16·97
14·25	15·67	11·75	·0453	11·24	22·25	24·47	18·35	·0706	17·14
14·50	15·95	11·96	·0461	11·43	22·50	24·75	18·56	·0714	17·32
14·75	16·22	12 17	·0469	11·62	22·75	25·02	18·77	·0722	17·51
15	16·50	12·38	·0477	11·82	23	25·30	18·98	·0729	17·69
15·25	16·77	12·58	·0485	11·99	23·25	25·57	19·18	·0738	17·86
15·50	17·05	12·79	·0493	12·19	23·50	25·85	19·39	·0746	18·04
15·75	17·32	12·99	·0501	12·37	23·75	26·12	19·59	1·0753	18·22

Clerget's Table for Correcting the Indications of Soleil's Saccharimeter in the Estimation of Sugar.

10° C.	15° C.	20° C.	N.	N'.	10° C.	15° C.	20° C.	N.	N'.
1·39	1·37	1·34	1	1·64	58·42	57·36	56·30	42	68·67
2·78	2·73	2·68	2	3·27	59·81	58·73	57·64	43	70·31
4·16	4·10	4·02	3	4·91	61·20	60·09	58·98	44	71·95
5·56	5·46	5·36	4	6·54	62·59	61·46	60·32	45	73·58
6·95	6·83	6·70	5	8·17	63·99	62·82	61·66	46	75·22
8·35	8·19	8·04	6	9·81	65·38	64·19	63·00	47	76·85
9·74	9·56	9·38	7	11·44	66·77	65·56	64·34	48	78·48
11·13	10·93	10·72	8	13·08	68·17	66·92	65·68	49	80·12
12·52	12·29	12·06	9	14·71	69·57	68·29	67·03	50	81·75
13·91	13·66	13·41	10	16·35	70·95	69·66	68·37	51	83·38
15·30	15·03	14·75	11	17·99	72·34	71·02	69·71	52	85·01
16·69	16·40	16·09	12	19·62	73·73	72·39	71·05	53	86·65
18·08	17·77	17·43	13	21·26	75·12	73·76	72·40	54	88·29
19·47	19·14	18·77	14	22·89	76·51	75·12	73·74	55	89·93
20·86	20·51	20·11	15	24·52	77·90	76·49	75·08	56	91·56
22·26	21·88	21·45	16	26·16	79·29	77·85	76·42	57	93·20
23·65	23·25	22·79	17	27·79	80·68	79·22	77·76	58	94·83
25·04	24·62	24·13	18	29·43	82·07	80·59	79·10	59	96·46
26·43	25·90	25·47	19	31·06	83·46	81·94	80·43	60	98·10
27·82	27·31	26·81	20	32·70	84·86	83·31	81·78	61	99·73
29·21	28·68	28·15	21	34·34	86·25	84·68	83·12	62	101·4
30·60	30·05	29·49	22	35·98	87·64	86·05	84·46	63	103·0
31·99	31·42	30·83	23	37·61	89·02	87·43	85·80	64	104·6
33·38	32·79	32·16	24	39·25	90·41	88·80	87·14	65	106·3
34·77	34·16	33·51	25	40·88	91·81	90·16	88·48	66	107·9
36·17	35·53	34·85	26	42·51	93·20	91·54	89·82	67	109·5
37·57	36·90	36·19	27	44·15	94·59	92·90	91·16	68	111·2
38·94	38·25	37·53	28	45·78	96·00	94·25	92·50	69	112·8
40·34	39·60	38·87	29	47·42	97·38	95·60	93·83	70	114·4
41·74	40·97	40·21	30	49·05	98·77	96·96	95·17	71	116·1
43·12	42·33	41·55	31	50·69	100·2	98·33	96·51	72	117·7
44·51	43·70	42·89	32	52·33	101·6	99·70	97·85	73	119·3
45·90	45·07	44·23	33	53·97	102·9	101·1	99·19	74	121·0
47·20	46·43	45·57	34	55·60	104·3	102·4	100·5	75	122·6
48·68	47·80	46·91	35	57·24	105·7	103·8	101·9	76	124·2
50·08	49·16	48·25	36	58·87	107·1	105·2	103·2	77	125·9
51·47	50·53	49·59	37	60·50	108·5	106·5	104·5	78	127·5
52·86	51·90	50·93	38	62·14	109·9	107·9	105·9	79	129·1
54·25	53·26	52·27	39	63·77	111·3	109·3	107·2	80	130·8
55·64	54·63	53·63	40	65·40	112·7	110·9	108·6	81	132·4
57·03	55·99	54·96	41	67·03	114·1	112·0	109·9	82	134·1

CLERGET'S TABLE FOR CORRECTING, &c.—*continued.*

10° C.	15° C.	20° C.	N.	N′.	10° C.	15° C.	20° C.	N.	N′.
115·5	113·3	111·3	83	135·7	148·8	146·1	143·4	107	174·9
116·9	114·7	112·6	84	137·3	150·2	147·5	144·8	108	176·6
118·2	116·1	113·9	85	139·0	151·6	148·8	146·1	109	178·2
119·6	117·4	115·3	86	140·6	153·0	150·2	147·4	110	179·8
121·0	118·8	116·6	87	142·2	154·4	151·6	148·8	111	181·5
122·4	120·2	118·0	88	143·9	155·8	153·0	150·1	112	183·1
123·8	121·5	119·3	89	145·5	157·2	154·4	151·5	113	184·7
125·2	122·9	120·6	90	147·1	158·6	155·7	152·8	114	186·4
126·6	124·3	122·0	91	148·7	160·0	157·0	154·2	115	188·0
128·0	125·6	123·3	92	150·4	161·3	158·4	155·4	116	189·7
129·4	127·0	124·7	93	152·1	162·7	159·8	156·8	117	191·3
130·8	128·4	126·0	94	153·7	164·1	161·2	158·2	118	192·9
132·2	129·7	127·4	95	155·3	165·5	162·5	159·5	119	194·6
133·6	131·1	128·7	96	156·9	166·0	163·9	160·8	120	196·2
134·9	132·5	130·0	97	158·6	168·3	165·3	162·2	121	197·8
136·3	133·8	131·4	98	160·2	169·7	166·6	163·5	122	199·5
137·7	135·2	132·7	99	161·9	171·1	168·0	164·9	123	201·1
139·1	136·6	134·0	100	163·5	172·5	169·4	166·2	124	202·7
140·5	137·9	135·4	101	165·1	173·9	170·7	167·6	125	204·4
141·9	139·3	136·7	102	166·8	175·3	172·1	168·9	126	206·0
143·3	140·7	138·1	103	168·4	176·6	173·5	170·2	127	207·6
144·7	142·0	139·4	104	170·0	178·0	174·8	171·6	128	209·3
146·0	143·4	140·8	105	171·7	179·4	176·2	172·9	129	210·9
147·4	144·8	142·1	106	173·3	180·8	177·5	174·2	130	212·6

Use of this Table.

Number observed upon the Scale before immersion = D.
" " after " = D′.
Temperature C. .. .. = T.

1. The two figures indicated upon the scale are read to right and left of zero, the sum D + D = A.

   In the column of temperature nearest to that at the time of observation we find the figure approaching nearest to A, following the line horizontally we find under N and N′ figures indicating the quantity of sugar.

   The sugar employed contains N per cent. of crystallized sugar or N′ grams per litre.

2. The sugar solution being prep[illegible]efore, we read D and D′ to the same side of zero, [illegible] D − D′ = A, and proceed as before.

   The following approximate [illegible]ula can be used instead of the Table—

$$P \text{ (rotative power)} = \frac{200 \times A}{288 - T}; \quad P \times 1{\cdot}635 = \text{sugar in 1 litre.}$$

TABLE SHOWING THE RELATI(WEEN THE SPECIFIC GRAVITY OF SOLUTIONS OF . XTRACT, AND THE QUANTITY OF MATTER THEY CONTA.

Malt Extract.		Water.	Malt Extract in 100.	Sugar in 100.	Specific Gravity.
600	+	600	50·00	47·00	1·2160
600	+	900	40·00	37·00	1·1670
600	+	1200	33·33	31·50	1·1350
600	+	1500	28·57	26·75	1·1130
600	+	1800	25·00	24·00	1·1000

TABLE BY GRAHAM, HOFFMAN, AND REDWOOD, SHOWING THE STRENGTH OF WORT CORRESPONDING TO SPIRIT INDICATION (FOR THE DISTILLATION PROCESS).

Degrees of Spirit Indication.	·0	·1	·2	·3	·4	·5	·6	·7	·8	·9
0	0·0	0·3	0·6	0·9	1·2	1·5	1·8	2·1	2·4	2·7
1	3·0	3·3	3·7	4·1	4·4	4·8	5·1	5·5	5·9	6·2
2	6·6	7·0	7·4	7·8	8·2	8·6	9·0	9·4	9·8	10·2
3	10·7	11·1	11·5	12·0	12·4	12·9	13·3	13·8	14·2	14·7
4	15·1	15·5	16·0	16·4	16·8	17·3	17·7	18·2	18·6	19·1
5	19·5	19·9	20·4	20·9	21·3	21·8	22·2	22·7	23·1	23·6
6	24·1	24·6	25·0	25·5	26·0	26·4	26·9	27·4	27·8	28·3
7	28·8	29·2	29·7	30·2	30·7	31·2	31·7	32·2	32·7	33·2
8	33·7	34·3	34·8	35·4	35·9	36·5	37·0	37·5	38·0	38·6
9	39·1	39·7	40·2	40·7	41·2	41·7	42·2	42·7	43·2	43·7
10	44·2	44·7	45·1	45·6	46·0	46·5	47·0	47·5	48·0	48·5
11	49·0	49·6	50·1	50·6	51·2	51·7	52·2	52·7	53·3	53·8
12	54·3	54·9	55·4	55·9	56·4	56·9	57·4	57·9	58·4	59·9
13	59·4	60·0	60·5	61·1	61·6	62·2	62·7	63·3	63·8	64·3
14	64·8	65·4	65·9	66·5	67·1	67·6	68·2	68·7	69·3	69·9
15	70·5	71·1	71·7	72·3	72·9	73·5	74·1	74·7	75·3	75·9

Tables used in the Analysis of Beer, &c.

Table A.—Specific Gravity and Strength of Spirits.

Volume per cent.	Weight per cent.	Specific Gravity.	Volume per cent.	Weight per cent.	Specific Gravity.
1·0	0·80	0·99850	4·6	3·68	0·99336
1·1	0·88	0·99835	4·7	3·76	0·99322
1·2	0·96	0·99820	4·8	3·84	0·99308
1·3	1·04	0·99805	4·9	3·92	0·99294
1·4	1·12	0·99790	5·0	4·00	0·99280
1·5	1·20	0·99775	5·1	4·08	0·99267
1·6	1·28	0·99760	5·2	4·16	0·99254
1·7	1·36	0·99745	5·3	4·24	0·99241
1·8	1·44	0·99730	5·4	4·32	0·99228
1·9	1·52	0·99715	5·5	4·40	0·99215
2·0	1·60	0·99700	5·6	4·48	0·99202
2·1	1·68	0·99686	5·7	4·56	0·99189
2·2	1·76	0·99672	5·8	4·64	0·99176
2·3	1·84	0·99658	5·9	4·72	0·99163
2·4	1·92	0·99644	6·0	4·81	0·99150
2·5	2·00	0·99630	6·1	4·89	0·99137
2·6	2·08	0·99616	6·2	4·97	0·99124
2·7	2·16	0·99602	6·3	5·05	0·99111
2·8	2·24	0·99588	6·4	5·13	0·99098
2·9	2·32	0·99574	6·5	5·21	0·99085
3·0	2·40	0·99560	6·6	5·30	0·99072
3·1	2·48	0·99546	6·7	5·38	0·99059
3·2	2·56	0·99532	6·8	5·46	0·99046
3·3	2·64	0·99518	6·9	5·54	0·99033
3·4	2·72	0·99504	7·0	5·62	0·99020
3·5	2·80	0·99490	7·1	5·70	0·99008
3·6	2·88	0·99476	7·2	5·78	0·98996
3·7	2·96	0·99462	7·3	5·86	0·98984
3·8	3·04	0·99448	7·4	5·94	0·98972
3·9	3·12	0·99434	7·5	6·02	0·98960
4·0	3·20	0·99420	7·6	6·11	0·98949
4·1	3·28	0·99406	7·7	6·19	0·98936
4·2	3·36	0·99392	7·8	6·27	0·98924
4·3	3·44	0·99378	7·9	6·35	0·98912
4·4	3·52	0·99364	8·0	6·43	0·98900
4·5	3·60	0·99350			

TABLES USED IN THE ANALYSIS OF BEER, &c.—*continued.*

Table B.—Specific Gravity and Strength of Malt Extract.

Specific Gravity.	Malt Extract in 100 parts of Liquid.	Specific Gravity.	Malt Extract in 100 parts of Liquid.	Specific Gravity.	Malt Extract in 100 parts of Liquid.
1·000	0·000	1·024	6·000	1·048	11·809
1·001	0·250	1·025	6·244	1·049	12·047
1·002	0·500	1·026	6·488	1·050	12·285
1·003	0·750	1·027	6·731	1·051	12·523
1·004	1·000	1·028	6·975	1·052	12·761
1·005	1·250	1·029	7·219	1·053	13·000
1·006	1·500	1·030	7·463	1·054	13·238
1·007	1·750	1·031	7·706	1·055	13·476
1·008	2·000	1·032	7·950	1·056	13·714
1·009	2·250	1·033	8·195	1·057	13·952
1·010	2·500	1·034	8·438	1·058	14·190
1·011	2·750	1·035	8·681	1·059	14·428
1·012	3·000	1·036	8·925	1·060	14·666
1·013	3·250	1·037	9·170	1·061	14·904
1·014	3·500	1·038	9·413	1·062	15·139
1·015	3·750	1·039	9·657	1·063	15·371
1·016	4·000	1·040	9·901	1·064	15·604
1·017	4·250	1·041	10·142	1·065	15·837
1·018	4·500	1·042	10·381	1·066	16·070
1·019	4·750	1·043	10·619	1·067	16·302
1·020	5·000	1·044	10·857	1·068	16·534
1·021	5·250	1·045	11·095	1·069	16·767
1·022	5·500	1·046	11·333	1·070	17·000
1·023	5·750	1·047	11·595		

TABLE SHOWING THE QUANTITY OF HOPS PER QUARTER OF MALT OF ANY GRAVITY FROM 70 TO 105 POUNDS, AT THE RATIO OF $\frac{1}{8}$ TO 14 LBS. PER QUARTER.

Gravity.	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$
70	0·1250	0·2500	0·5000	0·7500	1·0000	1·2500
71	0·1267	0·2535	0·5070	0·7607	1·0142	1·2678
72	0·1284	0·2570	0·5140	0·7714	1·0284	1·2856
73	0·1301	0·2605	0·5210	0·7821	1·0426	1·3034
74	0·1318	0·2640	0·5280	0·7928	1·0568	1·3212
75	0·1335	0·2675	0·5350	0·8035	1·0710	1·3390
76	0·1352	0·2710	0·5420	0·8142	1·0852	1·3568
77	0·1369	0·2745	0·5490	0·8249	1·0994	1·3746
78	0·1386	0·2780	0·5560	0·8356	1·1136	1·3924
79	0·1403	0·2815	0·5630	0·8463	1·1278	1·4102
80	0·1420	0·2850	0·5700	0·8570	1·1420	1·4280
81	0·1437	0·2885	0·5770	0·8677	1·1562	1·4458
82	0·1454	0·2920	0·5840	0·8784	1·1704	1·4636
83	0·1471	0·2955	0·5910	0·8891	1·1846	1·4812
84	0·1488	0·2990	0·5980	0·8998	1·1988	1·4992
85	0·1505	0·3025	0·6050	0·9105	1·2130	1·5160
86	0·1522	0·3060	0·6120	0·9212	1·2272	1·5338
87	0·1539	0·3095	0·6190	0·9319	1·2414	1·5516
88	0·1556	0·3130	0·6260	0·9426	1·2556	1·5694
89	0·1573	0·3165	0·6330	0·9533	1·2698	1·5872
90	0·1590	0·3200	0·6400	0·9640	1·2840	1·6050
91	0·1607	0·3235	0·6470	0·9747	1·2982	1·6228
92	0·1624	0·3270	0·6540	0·9854	1·3124	1·6406
93	0·1641	0·3305	0·6610	0·9961	1·3266	1·6584
94	0·1658	0·3340	0·6680	1·0068	1·3408	1·6762
95	0·1675	0·3375	0·6750	1·0175	1·3550	1·6940
96	0·1692	0·3410	0·6820	1·0282	1·3692	1·7118
97	0·1709	0·3445	0·6890	1·0389	1·3834	1·7296
98	0·1726	0·3480	0·6960	1·0496	1·3976	1·7474
99	0·1743	0·3515	0·7030	1·0603	1·4118	1·7652
100	0·1760	0·3550	0·7100	1·0710	1·4260	1·7830
101	0·1777	0·3580	0·7170	1·0817	1·4402	1·8008
102	0·1794	0·3620	0·7240	1·0924	1·4544	1·8186
103	0·1811	0·3655	0·7310	1·1031	1·4686	1·8364
104	0·1828	0·3698	0·7380	1·1138	1·4828	1·8542
105	0·1845	0·3725	0·7450	1·1245	1·4970	1·8720

TABLE SHOWING THE QUANTITY OF HOPS PER QUARTER OF MALT, &c.—*continued.*

Gravity.	1½	1¾	2	2¼	2½	2¾
70	1·5000	1·7500	2·0000	2·2500	2·5000	2·7500
71	1·5214	1·7750	2·0285	2·2821	2·5364	2·7892
72	1·5428	1·8000	2·0570	2·3142	2·5728	2·8284
73	1·5642	1·8250	2·0855	2·3463	2·6092	2·8676
74	1·5856	1·8500	2·1140	2·3784	2·6456	2·9068
75	1·6070	1·8750	2·1425	2·4105	2·6820	2·9460
76	1·6284	1·9000	2·1710	2·4426	2·7184	2·9852
77	1·6498	1·9250	2·1995	2·4747	2·7548	3·0244
78	1·6712	1·9500	2·2280	2·5068	2·7912	3·0636
79	1·6926	1·9750	2·2565	2·5389	2·8276	3·1028
80	1·7140	2·0000	2·2850	2·5710	2·8640	3·1420
81	1·7354	2·0250	2·3135	2·6031	2·9004	3·1812
82	1·7568	2·0500	2·3420	2·6352	2·9368	3·2204
83	1·7782	2·0750	2·3705	2·6673	2·9732	3·2596
84	1·7996	2·1000	2·3990	2·6994	3·0096	3·2988
85	1·8210	2·1250	2·4275	2·7315	3·0460	3·3380
86	1·8424	2·1500	2·4560	2·7636	3·0824	3·3772
87	1·8638	2·1750	2·4845	2·7957	3·1188	3·4164
88	1·8852	2·2000	2·5130	2·8278	3·1552	3·4556
89	1·9066	2·2250	2·5415	2·8599	3·1916	3·4948
90	1·9280	2·2500	2·5700	2·8920	3·2280	3·5340
91	1·9494	2·2750	2·5985	2·9240	3·2644	3·5732
92	1·9708	2·3000	2·6270	2·9562	3·3008	3·6124
93	1·9922	2·3250	3·6555	2·9883	3·3372	3·6516
94	2·0136	2·3500	2·6840	3·0204	3·3736	3·6908
95	2·0350	2·3750	2·7125	3·0525	3·4100	3·7300
96	2·0564	2·4000	2·7410	3·0846	3·4464	3·7692
97	2·0778	2·4250	2·7695	3·1167	3·4828	3·8084
98	2·0992	2·4500	2·7980	3·1488	3·5192	3·8476
99	2·1206	2·4750	2·8265	3·1809	3·5556	3·8868
100	2·1420	2·5000	2·8550	3·2130	3·5920	3·9260
101	2·1634	2·5250	2·8835	3·2451	3·6284	3·9652
102	2·1848	2·5500	2·9120	3·2772	3·6648	4·0044
103	2·2062	2·5750	2·9405	3·3093	3·7012	4·0436
104	2·2276	2·6000	2·9690	3·3414	3·7376	4·0828
105	2·2490	2·6250	2·9975	3·3735	3·7740	4·1220

TABLE SHOWING THE QUANTITY OF HOPS PER QUARTER OF MALT, &c.—*continued.*

Gravity.	3	3¼	3½	3¾	4	4¼
70	3·0000	3·2500	3·5000	3·7500	4·0000	4·2500
71	3·0428	3·2964	3·5500	3·8035	4·0571	4·3107
72	3·0856	3·3428	3·6000	3·8570	4·1142	4·3714
73	3·1284	3·3892	3·6500	3·9105	4·1713	4·4321
74	3·1712	3·4356	3·7000	3·9640	4·2284	4·4928
75	3·2140	3·4820	3·7500	4·0175	4·2855	4·5535
76	3·2568	3·5284	3·8000	4·0710	4·3426	4·6142
77	3·2996	3·5748	3·8500	4·1245	4·3994	4·6749
78	3·3424	3·6212	3·9000	4·1780	4·4568	4·7356
79	3·3852	3·6676	3·9500	4·2315	4·5139	4·7963
80	3·4280	3·7140	4·0000	4·2850	4·5710	4·8570
81	3·4708	3·7604	4·0500	4·3385	4·6281	4·9177
82	3·5136	3·8068	4·1000	4·3920	4·6852	4·9784
83	3·5564	3·8532	4·1500	4·4455	4·7423	5·0391
84	3·5992	3·8996	4·2000	4·4990	4·7994	5·0998
85	3·6420	3·9460	4·2500	4·5525	4·8565	5·1605
86	3·6848	3·9924	4·3000	4·6060	4·9136	5·2212
87	3·7276	4·0388	4·3500	4·6595	4·9707	5·2819
88	3·7704	4·0852	4·4000	4·7130	5·0278	5·3426
89	3·8132	4·1316	4·4500	4·7665	5·0849	5·4033
90	3·8560	4·1780	4·5000	4·8200	5·1420	5·4640
91	3·8988	4·2244	4·5500	4·8735	5·1991	5·5247
92	3·9416	4·2708	4·6000	4·9270	5·2562	5·5854
93	3·9844	4·3172	4·6500	4·9805	5·3133	5·6461
94	4·0272	4·3636	4·7000	5·0340	5·3704	5·7068
95	4·0700	4·4100	4·7500	5·0875	5·4275	5·7675
96	4·1128	4·4564	4·8000	5·1410	5·4846	5·8282
97	4·1556	4·5028	4·8500	5·1945	5·5417	5·8889
98	4·1984	4·5492	4·9000	5·2480	5·5988	5·9496
99	4·2412	4·5956	4·9500	5·3015	5·6559	6·0103
100	4·2840	4·6420	5·0000	5·3550	5·7130	6·0710
101	4·3268	4·6884	5·0500	5·4085	5·7701	6·1317
102	4·3696	4·7348	5·1000	5·4620	5·8272	6·1924
103	4·4124	4·7812	5·1500	5·5155	5·8843	6·2531
104	4·4552	4·8276	5·2000	5·5690	5·9414	6·3138
105	4·4980	4·8740	5·2500	5·6225	5·9985	6·3745

TABLE SHOWING THE QUANTITY OF HOPS PER QUARTER OF MALT, &c.—*continued.*

Gravity.	$4\frac{1}{2}$	$4\frac{3}{4}$	5	$5\frac{1}{4}$	$5\frac{1}{2}$	$5\frac{3}{4}$
70	4·5000	4·7500	5·0000	5·2500	5·5000	5·7500
71	4·5642	4·8178	5·0714	5·3250	5.5785	5·8321
72	4·6284	4·8856	5·1428	5·4000	5·6570	5·9142
73	4·6926	4·9534	5·2142	5·4750	5·7355	5·9963
74	4·7568	5·0212	5·2856	5·5500	5·8140	6·0784
75	4·8210	5·0890	5·3570	5·6250	5·8925	6·1605
76	4·8852	5·1568	5·4284	5·7000	5·9710	6·2426
77	4·9494	5·2246	5·4998	5·7750	6·0495	6·3247
78	5·0136	5·2924	5·5712	5·8500	6·1280	6·4068
79	5·0778	5·3602	5·6426	5·9250	6·2065	6·4889
80	5·1420	5·4280	5·7140	6·0000	6·2850	6·5710
81	5·2062	5·4958	5·7854	6·0750	6·3635	6·6531
82	5·2704	5·5636	5·8568	6·1500	6·4420	6·7352
83	5·3346	5·6314	5·9282	6·2250	6·5205	6·8173
84	5·3998	5·6992	5·9996	6·3000	6·5990	6·8994
85	5·4630	5·7670	6·0710	6·3750	6·6775	6·9815
86	5·5272	5·8348	6·1424	6·4500	6·7560	7·0636
87	5·5914	5·9026	6·2138	6·5250	6·8345	7·1457
88	5·6556	5·9704	6·2852	6·6000	6·9130	7·2278
89	5·7198	6·0382	6·3566	6·6750	6·9915	7·3099
90	5·7840	6·1060	6·4280	6·7500	7·0700	7·3920
91	5·8482	6·1738	6·4994	6·8250	7·1485	7·4741
92	5·9124	6·2416	6·5708	6·9000	7·2270	7·5562
93	5·9766	6·3094	6·6422	6·9750	7·3055	7·6383
94	6·0408	6·3772	6·7136	7·0500	7·3840	7·7204
95	6·1050	6·4450	6·7850	7·1250	7·4625	7·8025
96	6·1692	6·5128	6·8564	7·2000	7·5410	7·8846
97	6·2334	6·5806	6·9278	7·2750	7·6195	7·9667
98	6·2976	6·6484	6·9992	7·3500	7·6980	8·0488
99	6·3618	6·7162	7·0706	7·4250	7·7765	8·1309
100	6·4260	6·7840	7·1420	7·5000	7·8550	8·2130
101	6·4902	6·8518	7·2134	7·5750	7·9335	8·2951
102	6·5544	6·9196	7·2848	7·6500	8·0120	8·3772
103	6·6186	6·9874	7·3562	7·7250	8·0905	8·4593
104	6·6828	7·0552	7·4276	7·8000	8·1690	8·5414
105	6·7470	7·1230	7·4990	7·8750	8·2475	8·6235

TABLE SHOWING THE QUANTITY OF HOPS PER QUARTER OF MALT, &c.—*continued.*

Gravity.	6	6¼	6½	6¾	7	7¼
70	6·0000	6·2500	6·5000	6·7500	7·0000	7·2500
71	6·0857	6·3392	6·5928	6·8464	7·1000	7·3535
72	6·1714	6·4284	6·6856	6·9428	7·2000	7·4570
73	6·2571	6·5176	6·7784	7·0392	7·3000	7·5605
74	6·3428	6·6068	6·8712	7·1356	7·4000	7·6640
75	6·4285	6·6960	6·9640	7·2320	7·5000	7·7675
76	6·5142	6·7852	7·0568	7·3284	7·6000	7·8710
77	6·5999	6·8744	7·1496	7·4240	7·7000	7·9745
78	6·6856	6·9636	7·2424	7·5212	7·8000	8·0780
79	6·7713	7·0528	7·3352	7·6176	7·9000	8·1815
80	6·8570	7·1420	7·4280	7·7140	8·0000	8·2850
81	6·9427	7·2312	7·5208	7·8104	8·1000	8·3885
82	7·0284	7·3204	7·6136	7·9068	8·2000	8·4920
83	7·1141	7·4096	7·7064	8·0032	8·3000	8·5955
84	7·1998	7·4988	7·7992	8·0996	8·4000	8·6996
85	7·2855	7·5880	7·8920	8·1960	8·5000	8·8025
86	7·3712	7·6772	7·9848	8·2924	8·6000	8·9060
87	7·4569	7·7664	8·0776	8·3888	8·7000	9·0095
88	7·5426	7·8556	8·1704	8·4852	8·8000	9·1130
89	7·6283	7·9448	8·2632	8·5816	8·9000	9·2165
90	7·7140	8·0340	8·3560	8·6780	9·0000	9·3200
91	7·7997	8·1232	8·4488	8·7744	9·1000	9·4235
92	7·8854	8·2124	8·5416	8·8708	9·2000	9·5270
93	7·9711	8·3016	8·6344	8·9672	9·3000	9·6305
94	8·0568	8·3908	8·7272	9·0636	9·4000	9·7340
95	8·1425	8·4800	8·8200	9·1600	9·5000	9·8375
96	8·2282	8·5692	8·9124	9·2564	9·6000	9·9410
97	8·3139	8·6584	9·0056	9·3528	9·7000	10·0445
98	8·3996	8·7476	9·0984	9·4492	9·8000	10·1480
99	8·4853	8·8368	9·1912	9·5456	9·9000	10·2515
100	8·5710	8·9260	9·2840	9·6420	10·0000	10·3550
101	8·6567	9·0152	9·3768	9·7384	10·1000	10·4585
102	8·7424	9·1044	9·4696	9·8348	10·2000	10·5620
103	8·8281	9·1936	9·5624	9·9312	10·3000	10·6655
104	8·9138	9·2828	9·6552	10·0276	10·4000	10·7690
105	8·9995	9·3720	9·7480	10·1240	10·5000	10·8725

TABLE SHOWING THE QUANTITY OF HOPS PER QUARTER OF MALT, &c.—*continued.*

Gravity.	7½	7¾	8	8¼	8½	8¾
70	7·5000	7·7500	8·0000	8·2500	8·5000	8·7500
71	7·6071	7·8607	8·1142	8·3678	8·6214	8·8750
72	7·7142	7·9714	8·2284	8·4856	8·7428	9·0000
73	7·8213	8·0821	8·3426	8·6034	8·8642	9·1250
74	7·9284	8·1928	8·4568	8·7212	8·9850	9·2500
75	8·0355	8·3035	8·5710	8·8390	9·1070	9·3750
76	8·1426	8·4142	8·6852	8·9568	9·2284	9·5000
77	8·2497	8·5249	8·7994	9·0746	9·3498	9·6250
78	8·3568	8·6356	8·9136	9·1924	9·4712	9·7500
79	8·4639	8·7463	9·0278	9·3102	9·5927	9·8750
80	8·5710	8·8570	9·1420	9·4280	9·7140	10·0000
81	8·6781	8·9677	9·2562	9·5458	9·8354	10·1250
82	8·7852	9·0784	9·3704	9·6636	9·9568	10·2500
83	8·8923	9·1891	9·4846	9·7814	10·0782	10·3750
84	8·9994	9·2998	9·5998	9·8992	10·1996	10·5000
85	9·1065	9·4105	9·7130	10·0170	10·3210	10·6250
86	9·2136	9·5212	9·8272	10·1348	10·4424	10·7500
87	9·3207	9·6319	9·9414	10·2526	10·5638	10·8750
88	9·4278	9·7426	10·0516	10·3704	10·6852	11·0000
89	9·5349	9·8533	10·1698	10·4882	10·8006	11·1250
90	9·6420	9·9640	10·2840	10·6060	10·9280	11·2500
91	9·7491	10·0747	10·3982	10·7238	11·0494	11·3750
92	9·8562	10·1854	10·5124	10·8416	11·1708	11·5000
93	9·9633	10·2961	10·6266	10·9514	11·2922	11·6250
94	10·0704	10·4068	10·7408	11·0772	11·4136	11·7500
95	10·1775	10·5175	10·8550	11·2950	11·5350	11·8750
96	10·2846	10·6282	10·9692	11·3128	11·6564	12·0000
97	10·3917	10·7389	11·0834	11·4306	11·7778	12·1250
98	10·4988	10·8496	11·1976	11·5484	11·8992	12·2500
99	10·6059	10·9603	11·3118	11·6662	12·0206	12·3750
100	10·7130	11·0710	11·4260	11·7840	12·1420	12·5000
101	10·8201	11·1817	11·5402	11·9018	12·2634	12·6250
102	10·9272	11·2924	11·6544	12·0196	12·3848	12·7500
103	11·0343	11·4031	11·7686	12·1374	12·5062	12·8750
104	11·1414	11·5138	11·8828	12·2552	12·6267	13·0000
105	11·2485	11·6245	11·9970	12·3730	12·7490	13·1250

TABLE SHOWING THE QUANTITY OF HOPS PER QUARTER OF MALT, &c.—*continued.*

Gravity.	9	$9\frac{1}{4}$	$9\frac{1}{2}$	$9\frac{3}{4}$	10	$10\frac{1}{4}$
70	9·0000	9·2500	9·5000	9·7500	10·0000	10·2500
71	9·1285	9·3821	9·6357	9·8892	10·1428	10·3964
72	9·2570	9·5142	9·7714	10·0284	10·2856	10·5428
73	9·3855	9·6463	9·9071	10·1676	10·4284	10·6892
74	9·5140	9·7784	10·0428	10·3068	10·5712	10·8356
75	9·6425	9·9105	10·1785	10·4460	10·7140	10·9820
76	9·7710	10·0426	10·3142	10·5852	10·8568	11·1284
77	9·8995	10·1747	10·4499	10·7244	10·9996	11·2748
78	10·0280	10·3068	10·5856	10·8636	11·1424	11·4212
79	10·1565	10·4389	10·7213	11·0028	11·2852	11·5676
80	10·2850	10·5710	10·8570	11·1420	11·4280	11·7140
81	10·4135	10·7031	10·9927	11·2812	11·5708	11·8604
82	10·5420	10·8352	11·1284	11·4204	11·7136	12·0068
83	10·6705	10·9673	11·2641	11·5596	11·8564	12·1532
84	10·7990	11·0994	11·3998	11·6988	11·9992	12·2996
85	10·9275	11·2315	11·5355	11·8380	12·1420	12·4460
86	11·0560	11·3636	11·6712	11·9772	12·2848	12·5924
87	11·1845	11·4957	11·8069	12·1164	12·4276	12·7388
88	11·3130	11·6278	11·9426	12·2556	12·5704	12·8852
89	11·4415	11·7599	12·0783	12·3948	12·7132	13·0316
90	11·5700	11·8920	12·2140	12·5340	12·8560	13·1780
91	11·6985	12·0241	12·3497	12·6732	12·9988	13·3244
92	11·8270	12·1562	12·4854	12·8124	13·1416	13·4708
93	11·9555	12·2883	12·6211	12·9516	13·2844	13·6172
94	12·0840	12·4204	12·7568	13·0908	13·4272	13·7636
95	12·2125	12·5525	12·8925	13·2300	13·5700	13·9100
96	12·4410	12·6846	13·0282	13·3692	13·7128	14·0564
97	12·5695	12·8167	13·1639	13·5084	13·8556	14·2028
98	12·6980	12·9488	13·2996	13·6476	13·9984	14·3492
99	12·8265	13·0809	13·4353	13·7868	14·1412	14·4956
100	12·9550	13·2130	13·5710	13·9260	14·2840	14·6420
101	13·0835	13·3451	13·7067	14·0652	14·4268	14·7884
102	13·2120	13·4772	13·8424	14·2044	14·5696	14·9348
103	13·3405	13·5093	13·9781	14·3436	14·7124	15·0812
104	13·4680	13·7414	14·1138	14·4828	14·8552	15·2276
105	13·5965	13·8735	14·2495	14·6220	14·9980	15·3740

TABLE SHOWING THE QUANTITY OF HOPS PER QUARTER OF MALT, &c.—*continued.*

Gravity.	10½	10¾	11	11¼	11½
70	10·5000	10·7500	11·0000	11·2500	11·5000
71	10·6500	10·9035	11·1571	11·4107	11·6642
72	10·8000	11·0570	11·3142	11·5714	11·8284
73	10·9500	11·2105	11·4713	11·7321	11·9926
74	11·1000	11·3640	11·6284	11·8928	12·1568
75	11·2500	11·5175	11·7855	12·0535	12·3210
76	11·4000	11·6710	11·9426	12·2142	12·4852
77	11·5500	11·8245	12·0997	12·3749	12·6494
78	11·7000	11·9780	12·2568	12·5356	12·8136
79	11·8500	12·1315	12·4139	12·6963	12·9778
80	12·0000	12·2850	12·5710	12·8570	13·1420
81	12·1500	12·4385	12·7281	13·0177	13·3062
82	12·3000	12·5920	12·8852	13·1784	13·4704
83	12·4500	12·7455	13·0423	13·3391	13·6346
84	12·6000	12·8990	13·1994	13·4998	13·7988
85	12·7500	13·0525	13·3565	13·6605	13·9630
86	12·9000	13·2060	13·5136	13·8212	14·1272
87	13·0500	13·3595	13·6707	13·9819	14·2914
88	13·2000	13·5130	13·8278	14·1426	14·4556
89	13·3500	13·6665	13·9849	14·3033	14·6198
90	13·5000	13·8200	14·1420	14·4640	14·7840
91	13·6500	13·9735	14·2991	14·6247	14·9482
92	13·8000	14·1270	14·4562	14·7854	15·1124
93	13·9500	14·2805	14·6133	14·9461	15·2766
94	14·1000	14·4340	14·7704	15·1068	15·4408
95	14·2500	14·5875	14·9275	15·2675	15·6050
96	14·4000	14·7410	15·0846	15·4282	15·7692
97	14·5500	14·8945	15·2417	15·5889	15·9334
98	14·7000	15·0480	15·3988	15·7496	16·0976
99	14·8500	15·2015	15·5559	15·9103	16·2618
100	15·0000	15·3550	15·7130	16·0710	16·4260
101	15·1500	15·5085	15·8701	16·2317	16·5902
102	15·3000	15·6620	16·0272	16·3924	16·7544
103	15·4500	15·8155	16·1843	16·5531	16·9186
104	15·6000	15·9690	16·3414	16·7138	17·0828
105	15·7500	16·1225	16·4985	16·8745	17·2470

TABLE SHOWING THE QUANTITY OF HOPS PER QUARTER OF MALT, &c.—*continued.*

Gravity.	11¾	12	12¼	12½	12¾
70	11·7500	12·0000	12·2500	12·5000	12·7500
71	11·9178	12·1714	12·4250	12·6785	12·9321
72	12·0856	12·3428	12·6000	12·8570	13·1142
73	12·2534	12·5142	12·7750	13·0320	13·2963
74	12·4212	12·6856	12·9500	13·2105	13·4784
75	12·5890	12·8570	13·1250	13·3890	13·6605
76	12·7568	13·0284	13·3000	13·5675	13·8426
77	12·9246	13·1998	13·4750	13·7460	14·0247
78	13·0924	13·3712	13·6500	13·9245	14·2068
79	13·2602	13·5426	13·8250	14·1030	14·3889
80	13·4280	13·7140	14·0000	14·2815	14·5710
81	13·5958	13·8885	14·1750	14·4600	14·7531
82	13·7636	14·0568	14·3500	14·6385	14·9352
83	13·9314	14·2282	14·5250	14·8170	15·1173
84	14·0992	14·3996	14·7000	14·9955	15·2994
85	14·2670	14·5710	14·8750	15·1740	15·4815
86	14·4348	14·7424	15·0500	15·3525	15·6636
87	14·6026	14·9138	15·2250	15·5310	15·8457
88	14·7704	15·0852	15·4000	15·7095	16·0278
89	14·9382	15·2566	15·5750	15·8880	16·2099
90	15·1060	15·4280	15·7500	16·0665	16·3920
91	15·2738	15·5994	15·9250	16·2450	16·5741
92	15·4416	15·7708	16·1000	16·4235	16·7562
93	15·6094	15·9422	16·2750	16·6020	16·9383
94	15·7772	16·1136	16·4500	16·7805	17·1204
95	15·9450	16·2850	16·6250	16·9590	17·3025
96	16·1128	16·4564	16·8000	17·1375	17·4846
97	16·2806	16·6278	16·9750	17·3160	17·6667
98	16·4484	16·7992	17·1500	17·4945	17·8488
99	16·6162	16·9706	17·3250	17·6730	18·0309
100	16·7840	17·1420	17·5000	17·8515	18·2130
101	16·9518	17·3134	17·6750	18·0300	18·3951
102	17·1196	17·4848	17·8500	18·2085	18·5772
103	17·2874	17·6562	18·0250	18·3870	18·7593
104	17·4552	17·8276	18·2000	18·5655	18·9414
105	17·6230	17·9990	18·3750	18·7440	19·1235

TABLE SHOWING THE QUANTITY OF HOPS PER QUARTER OF MALT, &c.—*continued.*

Gravity.	13	13¼	13½	13¾	14
70	13·0000	13·2500	13·5000	13·7500	14·0000
71	13·1857	13·4392	13·6928	13·9464	14 2000
72	13·3714	13·6284	13·8865	14·1428	14·4000
73	13·5571	13·8176	14·0784	14·3392	14·6000
74	13·7428	14·0068	14·2712	14·5356	14·8000
75	13·9285	14·1960	14·4640	14·7320	15·0000
76	14·1142	14·3852	14·6568	14·9284	15·2000
77	14·2999	14·5744	14·8496	15·1248	15·4000
78	14·4856	14·7636	15·0424	15·3212	15·6000
79	14·6713	14·9528	15·2352	15·5176	15·8000
80	14·8570	15·1410	15·4280	15·7140	16·0000
81	15·0427	15·3302	15·6208	15·9104	16·2000
82	15·2284	15·5194	15·8136	16·1068	16·4000
83	15·4141	15·7086	16·0064	16·3032	16·6000
84	15·5998	15·8978	16·1992	16·4996	16·8000
85	15·7855	16·0870	16·3920	16·6960	17·0000
86	15·9712	16·2762	16·5848	16·8924	17·2000
87	16·1569	16·4654	16·7776	17·0881	17·4000
88	16·3426	16·6546	16·9704	17·2852	17·6000
89	16·5283	16·8438	17·1632	17·4816	17·8000
90	16·7146	17·0320	17·3560	17·6780	18·0000
91	16·8997	17·2212	17·5488	17·8744	18·2000
92	17·0854	17·4104	17·7416	18·0708	18·4000
93	17·2711	17·6096	17·9344	18·2672	18·6000
94	17·4568	17·7988	18·1272	18·4636	18·8000
95	17·6425	17·9880	18·3200	18·6600	19·0000
96	17·8282	18·1772	18·5128	18·8564	19·2000
97	18·0139	18·3664	18·7056	19·0528	19·4000
98	18·1996	18·5556	18·8984	19·2492	19·6000
99	18·3853	18·7448	19·0912	19·4456	19·8000
100	18·5710	18·9340	19·2840	19·6420	20·0000
101	18·7567	19·1232	19·4768	19·8384	20·2000
102	18·9424	19·3124	19·6696	20·0348	20·4000
103	19·1281	19·5016	19·8624	20·2312	20·6000
104	19·3138	19·6908	20·0552	20·4276	20·8000
105	19·4995	19·8800	20·2480	20·6240	21·0000

RICHARDSON'S TABLE, SHOWING THE VOLUME OF WORT IMBIBED BY HOPS.

Hops used.	Wort imbibed.	Hops used.	Wort imbibed.
lbs.	bar.	lbs.	bar.
1	0·01	30	0·50
2	0·03	40	0·66
3	0·05	50	0·83
4	0·06	60	1·00
5	0·08	70	1·16
6	0·10	80	1·33
7	0·11	90	1·50
8	0·13	100	1·66
9	0·15	200	3·33
10	0·16	300	5·00
11	0·17	400	6·66
12	0·19	500	8·33
13	0·21	600	10·00
14	0·22	700	11·66
15	0·24	800	13·32
16	0·26	900	15·00
17	0·27	1000	16·66
18	0·29	2000	33·30
19	0·31	3000	50·00
20	0·33	4000	66·66

LEVESQUE'S TABLE, SHOWING THE INCREASE OF HOPS REQUIRED FOR EVERY DEGREE, FROM 50° TO 75° FAHR. (10° TO 23·8° C.), AND FROM 4 LBS. TO 9 LBS. PER QUARTER.

Temperature of Air at Time of Brewing.		Four Pounds per Quarter.	Five Pounds per Quarter.	Six Pounds per Quarter.	Seven Pounds per Quarter.	Eight Pounds per Quarter.	Nine Pounds per Quarter.
Fahr.	C.						
50°	10°	4·00	5·00	6·00	7·00	8·00	9·00
51	10·5	4·08	5·10	6·12	7·14	8·16	9·18
52	11·1	4·16	5·20	6·24	7·28	8·32	9·36
53	11·6	4·24	5·30	6·36	7·42	8·48	9·54
54	12·2	4·32	5·40	6·48	7·56	8·64	9·72
55	12·7	4·40	5·50	6·60	7·70	8·80	9·90
56	13·3	4·48	5·60	6·72	7·84	8·96	10·08
57	13·8	4·56	5·70	6·84	7·98	9·12	10·26
58	14·4	4·64	5·80	6·96	8·12	9·28	10·44
59	15·0	4·72	5·90	7·08	8·26	9·44	10·52
60	15·5	4·80	6·00	7·20	8·40	9·60	10·70
61	16·1	4·88	6·10	7·32	8·54	9·76	10·88
62	16·6	4·96	6·20	7·44	8·68	9·92	11·06
63	17·2	5·04	6·30	7·56	8·82	10·08	11·24
64	17·7	5·12	6·40	7·68	8·96	10·24	11·42
65	18·3	5·20	6·50	7·80	9·10	10·40	11·60
66	18·8	5·28	6·60	7·92	9·24	10·56	11·88
67	19·4	5·36	6·70	8·04	9·38	10·72	12·06
68	20·0	5·44	6·80	8·16	9·52	10·88	12·24
69	20·5	5·52	6·90	8·28	9·66	11·04	12·42
70	21·1	5·60	7·00	8·40	9·80	11·20	12·60
71	21·6	5·68	7·10	8·52	9·94	11·36	12·78
72	22·2	5·76	7·20	8·64	10·08	11·52	12·96
73	22·7	5·84	7·30	8·76	10·22	11·68	13·14
74	23·3	5·92	7·40	8·88	10·36	11·84	13·32
75	23·8	6·00	7·50	9·00	10·50	12·00	13·50

Levesque's Table.

In the first column under each class the temperature of the air is given; the next columns show the degrees the water should stand at to bring the mash to the temperature given at the top of the column, while at the foot of the column is given the temperature at which the tap stands.

Temperature of the Air at Mashing.	Class I. Heat of Mash, 146° to 148°.	Time of Standing of the Mash.	Temperature of the Air at Mashing.	Class II. Heat of the Mash, 145° to 147°.		Time of Standing of the Mash.
	Firkins per Quarter, 6.			Firkins per Quarter, 7.	Firkins per Quarter, 8.	
Fahr.		hrs. min.	Fahr.			hrs. min.
10°	197·00	4 0	10°	189·00	184·00	3 0
15	195·17	4 0	15	187·42	182·59	3 0
20	193·34	4 0	20	185·84	181·18	3 0
25	191·51	4 0	25	184·26	179·77	3 0
30	189·68	4 0	30	182·68	178·36	3 0
35	187·85	4 0	35	180·10	176·95	3 0
40	186·02	4 0	40	179·52	175·54	3 0
45	184·19	4 0	45	177·94	174·13	3 0
50	182·36	4 0	50	176·36	172·72	3 0
55	180·53	4 0	55	174·78	171·31	3 0
60	178·70	3 40	60	173·20	169·90	2 45
65	176·87	3 20	65	171·62	168·49	2 30
70	175·04	3 0	70	170·04	167·07	2 15

LEVESQUE'S TABLE—*continued.*

In the first column under each class the temperature of the air is given; the next columns show the degrees the water should stand at to bring the mash to the temperature given at the top of the column, while at the foot of the column is given the temperature at which the tap stands.

Temperature of Air at Mashing.	Class III. Heat of the Mash, 144° to 146°.		Time of Standing of the Mash.	Temperature of Air at Mashing.	Class IV. Heat of the Mash, 143° to 145°.		Time of Standing of the Mash.
	Firkins per Quarter, 9.	Firkins per Quarter, 10.			Firkins per Quarter, 11.	Firkins per Quarter, 12.	
Fahr.			hrs. min.	Fahr.			hrs. min.
10°	178·60	175·00	2 0	10°	172·00	170·00	1 0
15	176·84	173·92	2 0	15	171·00	169·19	1 0
20	175·68	172·84	2 0	20	170·00	168·28	1 0
25	174·52	171·76	2 0	25	169·00	167·37	1 0
30	173·36	170·68	2 0	30	168·00	166·46	1 0
35	172·20	169·60	2 0	35	167·00	165·55	1 0
40	171·04	168·52	2 0	40	166·00	164·64	1 0
45	169·88	167·44	2 0	45	165·00	163·73	1 0
50	168·72	166·36	2 0	50	164·00	162·82	1 0
55	167·56	165·28	2 0	55	163·00	161·91	1 0
60	166·40	164·20	1 50	60	162·00	161·10	0 55
65	165·24	163·12	1 40	65	161·00	160·19	0 50
70	164·08	162·04	1 30	70	160·00	159·28	0 45

LEVESQUE'S TABLE, SHOWING WHAT GRAVITY THE ORIGINAL WORT SHOULD POSSESS TO AFFORD A GYLE OF A CERTAIN STRENGTH AFTER ONE HOUR'S BOILING.

Gravity required after One Hour's Boiling.	Gravity required in the Raw Wort.	Gravity required after One Hour's Boiling.	Gravity required in the Raw Wort.
8	6·60	27	21·60
9	7·20	28	22·40
10	8·00	29	23·20
11	8·80	30	24·00
12	9·60	31	24·80
13	10·40	32	25·60
14	11·20	33	26·40
15	12·00	34	27·20
16	12·80	35	28·00
17	13·60	36	28·80
18	14·40	37	29·60
19	15·20	38	30·40
20	16·00	39	31·20
21	16·80	40	32·00
22	17·60	41	32·80
23	18·40	42	33·60
24	19·20	43	34·40
25	20·00	44	35·20
26	20·80	45	36·00

Bates' Table, showing the Decrease in the Specific Gravity of Worts at Temperatures above 60° Fahr.

Specific Gravity at 60° F.	Apparent Gravities giving the same Density at the accompanying Heats as the first column at 60° F.									
	Apparent Specific Gravity.	Degrees.	Apparent Specific Gravity.	Degrees.	Apparent Specific Gravity.	Degrees.	Apparent Specific Gravity.	Degrees.	Apparent Specific Gravity.	Degrees.
1·000	0·998	79·00	0·996	93·00	0·994	105·00	0·992	115·50	·990	125·20
1·010	1·008	78·00	1·006	92·60	1·004	104·00	1·002	114·50	1·000	124·00
1·020	1·018	78·00	1·016	91·33	1·014	103·00	1·012	113·50	1·010	122·80
1·030	1·028	77·33	1·026	90·66	1·024	102·50	1·022	112·50	1·020	122·00
1·040	1·038	76·66	1·036	90·00	1·034	101·50	1·032	111·50	1·030	120·80
1·050	1·048	76·00	1·046	89·33	1·044	100·66	1·042	111·00	1·040	120·00
1·060	1·058	76·00	1·056	88·66	1·054	100·00	1·052	110·00	1·050	118·80
1·070	1·068	75·33	1·066	88·00	1·064	99·00	1·062	109·00	1·060	118·00
1·080	1·078	74·66	1·076	87·33	1·074	98·00	1·072	108·00	1·070	116·80
1·090	1·088	74·66	1·086	86·66	1·084	97·50	1·082	107·00	1·080	116·00
1·100	1·098	74·00	1·096	86·00	1·094	96·50	1·092	106·50	1·090	114·80
1·110	1·108	74·00	1·106	85·50	1·104	96·00	1·102	105·50	1·100	114·00
1·120	1·118	73·50	1·116	85·00	1·114	95·50	1·112	104·50	1·110	113·20
1·130	1·128	73·33	1·126	84·50	1·124	94·50	1·122	104·00	1·120	112·40
1·140	1·138	73·00	1·136	84·00	1·134	94·00	1·132	103·20	1·130	111·40
1·150	1·148	72·66	1·146	83·50	1·144	93·50	1·142	102·40	1·140	110·80

TABLE SHOWING THE SIGNS USED IN WRITING MEDICAL PRESCRIPTIONS.

½ grain	½ gr.
1 ,,	gr. j, or gr. i.
1½ ,,	gr. iss.
2 grains	gr. ii, or gr. ij.
2½ ,,	gr. iiss.
4 ,,	gr. iv.
8 ,,	gr. viii, or gr. viij.
½ scruple	℈ ss.
1 ,,	℈ i, or ℈ j.
1½ ,,	℈ iss.
2 scruples	℈ ii, or ℈ ij.
1 drachm	ʒ i, or ʒ j.
1½ ,,	ʒ iss.
2 drachms	ʒ ii, or ʒ ij.
3 ,,	ʒ iii, or ʒ iij.
3½ ,,	ʒ iiiss.
7½ ,,	ʒ viiss.
½ ounce	℥ ss.
1 ,,	℥ i, or ℥ j.
1½ ,,	℥ iss.
½ pint	Oss.
1 ,,	O.

TABLE FOR THE COMPARISON OF ALKALIMETRIC DEGREES (FOR K_2O).

Degrees Ponderal, equal per cent.	Descroizille's Alkalimetric Degrees.	Degrees Ponderal, equal per cent.	Descroizille's Alkalimetric Degrees.
1	1·04	25	26
2	2·08	30	31·20
3	3·12	35	36·41
4	4·16	40	41·61
5	5·21	45	46·81
6	6·24	50	52·01
7	7·28	55	57·21
8	8·32	60	62·41
9	9·36	65	67·61
10	10·40	70	72·81
15	15·60	75	78·01
20	20·80	80	83·21
·96	1	24·03	25
1·92	2	28·84	30
2·88	3	33·65	35
3·85	4	38·46	40
4·81	5	43·26	45
5·77	6	48·07	50
6·73	7	52·88	55
7·69	8	57·68	60
8·65	9	62·49	65
9 61	10	67·30	70
14·42	15	72·10	75
19·23	20	76·94	80

TABLE (BY MR. J. PATTINSON) FOR THE COMPARISON OF THE VARIOUS ALKALI-METRIC DEGREES (FOR SODA).

Per cent. of Na_2O. Eq. = 31.	Per cent. of Na_2CO_3.	English Degrees. Per cent. of Na_2O. Eq. = 32.	Descroizille's Degrees. Weight of H_2SO_4; neutralized by 100 parts.	Per cent. of Na_2O. Eq. = 31.	Per cent. of Na_2CO_3.	English Degrees. Per cent. of Na_2O. Eq. = 32.	Descroizille's Degrees. Weight of H_2SO_4. neutralized by 100 parts.
30·0	51·29	30·39	47·42	42·0	71·81	42·55	66·39
30·5	52·14	30·90	48·21	42·5	72·66	43·06	67·18
31·0	53·00	31·41	49·00	43·0	73·52	43·57	67·97
31·5	53·85	31·91	49·79	43·5	74·37	44·07	68·76
32·0	54·71	32·42	50·58	44·0	75·23	44·58	69·55
32·5	55·56	32·92	51·37	44·5	76·08	45·08	70·34
33·0	56·42	33·43	52·16	45·0	76·95	45·59	71·13
33·5	57·27	33·94	52·95	45·5	77·80	46·10	71·92
34·0	58·13	34·44	54·74	46·0	78·66	46·60	72·71
34·5	58·98	34·95	54·33	46·5	79·51	47·11	73·50
35·0	59·84	35·46	55·92	47·0	80·37	47·62	74·29
35·5	60·69	35·96	56·11	47·5	81·22	48·12	75·08
36·0	61·55	36·47	56·90	48·0	82·07	48·63	75·87
36·5	62·40	36·98	57·69	48·5	82·93	49·14	76·66
37·0	63·26	37·48	58·48	49·0	83·78	49·64	77·45
37·5	64·11	37·99	59·27	49·5	84·64	50·15	78·44
38·0	64·97	38·50	60·06	50·0	85·48	50·66	79·03
38·5	65·82	39·00	60·85	50·5	86·34	51·16	79·82
39·0	66·68	39·51	61·64	51·0	87·19	51·67	80·61
39·5	67·53	40·02	62·43	51·5	88·05	52·18	81·40
40·0	68·39	40·52	63·22	52·0	88·90	52·68	82·19
40·5	69·24	41·03	64·01	52·5	89·76	53·19	82·98
41·0	70·10	41·54	64·81	53·0	90·61	53·70	83·77
41·5	70·95	42·04	65·60	53·5	91·47	54·20	84·56

TABLE (BY MR. J. PATTINSON) FOR THE COMPARISON OF THE VARIOUS ALKALI-METRIC DEGREES (FOR SODA)—*continued.*

Per cent. of Na_2O. Eq. = 31.	Per cent. of Na_2CO_3.	English Degrees. Per cent. of Na_2O. Eq. = 32.	Descroizille's Degrees. Weight of H_2SO_4, neutralized by 100 parts.	Per cent. of Na_2O. Eq. = 31.	Per cent. of Na_2CO_3.	English Degrees. Per cent. of Na_2O. Eq. = 32.	Descroizille's Degrees. Weight of H_2SO_4; neutralized by 100 parts.
54·0	92·32	54·71	85·35	66·0	112·85	66·87	104·32
54·5	93·18	55·22	86·14	66·5	113·70	67·37	105·11
55·0	94·03	55·72	86·93	67·0	114·56	67·88	105·90
55·5	94·89	56·23	87·72	67·5	115·41	68·39	106·69
56·0	95·74	56·74	88·52	68·0	116·27	68·89	107·48
56·5	96·60	57·24	89·31	68·5	117·12	69·40	108·27
57·0	97·45	57·75	90·10	69·0	117·98	69·91	109·06
57·5	98·31	58·26	90·89	69·5	118·83	70·41	109·85
58·0	99·16	58·76	91·68	70·0	119·69	70·92	110·64
58·5	100·02	59·27	92·47	70·5	120·53	71·43	111·43
59·0	100·87	59·77	93·26	71·0	121·39	71·93	112·23
59·5	101·73	60·28	94·05	71·5	122·24	72·44	113·02
60·0	102·58	60·79	94·84	72·0	123·10	72·95	113·81
60·5	103·44	61·30	95·63	72·5	123·95	73·45	114·60
61·0	104·30	61·80	96·42	73·0	124·81	73·96	115·39
61·5	105·15	62·31	97·21	73·5	125·66	74·47	116·18
62·0	106·01	62·82	98·00	74·0	126·52	74·97	116·97
62·5	106·86	63·32	98·79	74·5	127·37	75·48	117·76
63·0	107·72	63·83	99·58	75·0	128·23	75·99	118·55
63·5	108·57	64·33	100·37	75·5	129·08	76·49	119·34
64·0	109·43	64·84	101·16	76·0	129·94	77·00	120·13
64·5	110·28	65·35	101·95	76·5	130·79	77·51	120·92
65·0	111·14	65·85	102·74	77·0	131·65	78·01	121·74
65·5	111·99	66·36	103·53	77·5	132·50	78·52	122·50

TABLE (BY MR. E. JACKSON) SHOWING FROM THE PERCENTAGE OF OXYGEN FOUND THE NUMBER OF CUBIC FEET OF RESIDUAL GASES PASSING AWAY FROM THE SULPHURIC ACID CHAMBERS PER TON OF STONE BURNT.

This Table is calculated on the assumption that 45 per cent. of sulphur is available, but can be made to answer for any other percentage by multiplying the number in the Table by the percentage of sulphur consumed and dividing by 45.

Oxygen, per cent.	Residual Gases. Cubic Feet per Ton of Stone.	Oxygen, per cent.	Residual Gases. Cubic Feet per Ton of Stone.	Oxygen, per cent.	Residual Gases. Cubic Feet per Ton of Stone.
·1	85451	3·2	100474	6·3	121905
·2	85865	3·3	101047	6·4	122749
·3	86283	3·4	101626	6·5	123606
·4	86706	3·5	102212	6·6	124474
·5	87132	3·6	102805	6·7	125355
·6	87562	3·7	103406	6·8	126248
·7	87998	3·8	104013	6·9	127155
·8	88437	3·9	104627	7·0	128074
·9	88881	4·0	105248	7·1	129006
1·0	89328	4·1	105877	7·2	129953
1·1	89781	4·2	106514	7·3	130913
1·2	90238	4·3	107158	7·4	131887
1·3	90701	4·4	107810	7·5	132876
1·4	91167	4·5	108471	7·6	133881
1·5	91639	4·6	109138	7·7	134900
1·6	92115	4·7	109816	7·8	135935
1·7	92597	4·8	110500	7·9	136986
1·8	93083	4·9	111194	8·0	138053
1·9	93575	5·0	111896	8·1	139138
2·0	94072	5·1	112607	8·2	140239
2·1	94574	5·2	113327	8·3	141358
2·2	95082	5·3	114057	8·4	142494
2·3	95594	5·4	114796	8·5	143650
2·4	96113	5·5	115544	8·6	144824
2·5	96637	5·6	116303	8·7	146018
2·6	97167	5·7	117072	8·8	147232
2·7	97703	5·8	117850	8·9	148465
2·8	98245	5·9	118639	9·0	149719
2·9	98793	6·0	119439	9·1	150996
3·0	99346	6·1	120250	9·2	152294
3·1	99907	6·2	121072	9·3	153614

TABLE BY MR. E. JACKSON—*continued.*

Oxygen, per cent.	Residual Gases. Cubic Feet per Ton of Stone.	Oxygen, per cent.	Residual Gases. Cubic Feet per Ton of Stone.	Oxygen, per cent.	Residual Gases. Cubic Feet per Ton of Stone.
9·4	154958	13·0	226172	16·6	418508
9·5	156325	13·1	229097	16·7	428634
9·6	157716	13·2	232099	16·8	439261
9·7	159134	13·3	235175	16·9	450429
9·8	160575	13·4	238343	17·0	462178
9·9	162045	13·5	241593	17·1	474558
10·0	163540	13·6	244932	17·2	487620
10·1	165064	13·7	248366	17·3	501420
10·2	166616	13·8	250899	17·4	516025
10·3	168198	13·9	255531	17·5	531506
10·4	169810	14·0	259271	17·6	547944
10·5	171453	14·1	263121	17·7	565431
10·6	173129	14·2	267088	17·8	584073
10·7	174837	14·3	271176	17·9	603983
10·8	176581	14·4	275391	18·0	625301
10·9	178358	14·5	279740	18·1	648178
11·0	180171	14·6	284227	18·2	672793
11·1	182023	14·7	288861	18·3	699348
11·2	183912	14·8	293649	18·4	728090
11·3	185841	14·9	298598	18·5	759294
11·4	187811	15·0	303717	18·6	793291
11·5	189823	15·1	309015	18·7	830479
11·6	191879	15·2	314500	18·8	871320
11·7	193919	15·3	320183	18·9	916389
11·8	196128	15·4	326076	19·0	966373
11·9	198323	15·5	332190	19·1	1022127
12·0	200568	15·6	338538	19·2	1084707
12·1	202865	15·7	345133	19·3	1155447
12·2	205214	15·8	351990	19·4	1236062
12·3	207619	15·9	359126	19·5	1328762
12·4	210081	16·0	366555	19·6	1436501
12·5	212602	16·1	374300	19·7	1563252
12·6	215184	16·2	382378	19·8	1714534
12·7	217830	16·3	390812	19·9	1898234
12·8	220541	16·4	399628	20·0	2126024
12·9	223322	16·5	408851		

TABLE (BY MR. J. PATTINSON) SHOWING A COMPARISON OF THE ENGLISH AND FRENCH CHLOROMETRIC DEGREES.

The French Degrees indicate how many litres, at 0° C. and 760 mm., are yielded by 1 kilo. of the Bleaching Powder.

The English Degrees, which are also used in Germany, in Russia, and in America, show the percentage of "active" Chlorine.

French Degrees.	English Degrees.	French Degrees.	English Degrees.	French Degrees.	English Degrees.
63	20·02	85	27·01	107	34·00
64	20·34	86	27·33	108	34·32
65	20·65	87	27·65	109	34·64
66	20·97	88	27·96	110	34·95
67	21·29	89	28·28	111	35·27
68	21·61	90	28·60	112	35·59
69	21·93	91	28·92	113	35·91
70	22·24	92	29·23	114	36·22
71	22·56	93	29·55	115	36·54
72	22·88	94	29·87	116	36·86
73	23·20	95	30·19	117	37·18
74	23·51	96	30·51	118	37·50
75	23·83	97	30·83	119	37·81
76	24·15	98	31·14	120	38·13
77	24·47	99	31·46	121	38·45
78	24·79	100	31·78	122	38·77
79	25·10	101	32·09	123	39·08
80	25·42	102	32·41	124	39·40
81	25·74	103	32·73	125	39·72
82	26·06	104	33·05	126	40·04
83	26·37	105	33·36	127	40·36
84	26·69	106	33·68	128	40·67

Table for Proportion of Bases in Manganese Mud.

This is used in the analysis of manganese mud to determine the proportion of bases to MnO_2. A certain volume of the mud being taken, then the number of grains of crystallized ferrosum sulphate is to the number of grains of crystallized oxalic acid decomposed and neutralized as 100 is to a figure in column A of the table. Opposite this figure in column B is the proportion of bases per equivalent of MnO_2.

A.	B.	A.	B.	A.	B.
69·5	1·066	65·00	·868	60·50	·670
69·25	1·055	64·75	·857	60·25	·659
69·00	1·044	64·50	·846	60·00	·648
68·75	1·033	64·25	·835	59·75	·637
68·50	1·022	64·00	·824	59·50	·626
68·25	1·011	63·75	·813	59·25	·615
68·00	1·000	63·50	·802	59·00	·604
67·75	·989	63·25	·791	58·75	·593
67·50	·978	63·00	·780	58·50	·582
67·25	·967	62·75	·769	58·25	·571
67·00	·956	62·50	·758	58·00	·560
66·75	·945	62·25	·747	57·75	·549
66·50	·934	62·00	·736	57·50	·538
66·25	·923	61·75	·725	57·25	·527
66·00	·912	61·50	·714	57·00	·516
65·75	·901	61·25	·703	56·75	·505
65·50	·890	61·00	·692	56·50	·494
65·25	·879	60·75	·681	56·25	·483

1 litre of chlorine at 0° C. and 760 mm. pressure weighs 3·17 grams.

1 c.c. $\frac{N}{10}$ arsenious or thiosulphate solution = ·00355 grm. Cl.

1·2267 grm. MnO_2 = 1 grm. Cl.

REIMAN'S TABLES SHOWING THE COMPOSITION OF THE VARIOUS KINDS OF ANILINE OILS FOUND IN COMMERCE.

	K = Kuphaniline.	B = Baraniline.
	per cent.	per cent.
Water, odorine, &c.	5	—
Aniline	90	—
Toluidine (para- and meta-)	5	70
Higher homologues	—	30

Distilling below Degrees C.	K=100 B= 0	K=90 B=10	K=85 B=15	K=80 B=20	K=75 B=25	K=62·5 B=37·5	K=60 B=40	K=50 B=50	K=37·5 B=62·5	K=25 B=75	K=0 B=100
180	2·5	7	2·5	5·5	3·5	4	—	4	2	3	—
—	6·0	—	—	22	3·5	3	—	3	2	2·5	—
185	54	50	29·5	—	5·5	2·5	7	4·5	—	2·5	—
—	—	—	—	—	—	—	—	—	—	—	2
190	34	34	56·5	55·5	55·5	41	37	7·5	5·5	4·5	1·5
195	—	5	7·5	8·5	15·	25	33	42	40	17	8
200	—	—	—	—	9	8·5	—	19	28·5	36	18
205	—	—	—	—	4·5	5	16	10	11	16	39
210	—	—	—	—	—	4·5	—	3·5	7·5	8	19
215	—	—	—	—	—	—	—	—	—	4·5	7
Residue.	3·5	4	4	8·5	3·5	6·5	7	6·5	3·5	5	5·5

KROUBER'S TABLES, SHOWING THE GENERAL CHARACTERS OF THE BENZOLS, NITROBENZOLS ANILINES, AND FUSCHINES, DERIVABLE ONE FROM THE OTHER.

Boiling Point of Benzol.	Specific Gravity of Benzol at 15°.	Principal Boiling Point of Nitro-benzol.	Specific Gravity of Nitro-benzol at 16°.	Yield of Aniline Oil per 100 parts of Nitro-benzol.	Principal Boiling Point of Aniline Oil.	Specific Gravity of Aniline Oil at 16°.	Yield of Colour obtainable, Crystallizable Fuschine = 1000.	Tint of Colour communicated to Goods Dyed therewith.
Deg. C.								
a 83– 84	0·9118	205–210	1·1591	59	180–185	1·0205	5	Dirty violet } contain chiefly violaniline.
b 80– 85	0·9263	205–210	1·1617	55	180–185	1·0199	20	Reddish violet
c 85– 90	0·9154	210–215	1·1577	56	185–190	1·0181	110	Violet red } mauvaniline with a little rosaniline.
d 90– 95	0·9210	210–215	1·1445	63	185–190	1·0139	160	Red
e 95–100	0·9089	215–220	1·1425	66	190–195	1·0109	230	Red.
f 100–105	0·9071	220–225	1·1365	73	195–200	1·0060	270	Red.
g 105–110	0·9048	220–225	1·1319	74	195–200	1·0018	240	Red.
h 110–115	0·9033	225–230	1·1235	69	200–205	1·0009	260	Red } contain much chrystoluidine.
i 115–120	0·9022	225–230	1·1187	74	200–205	0·9975	260	Yellowish red
j 120–125	0·9009	230–235	1·1182	73	205–210	0·9943	200	Red.
k 125–130	0·9001	230–235	1·1093	74	205–210	0·9926	180	Red.

KROUBER'S TABLES, SHOWING THE GENERAL CHARACTERS OF THE BENZOLS, &c.—*continued.*

Nitro-benzol from Benzol marked	Range of Temperature, Degrees C.												Total Distil-late.
	195 200	200 205	205 210	210 215	215 220	220 225	225 230	230 235	235 240	240 245	245 250	250 255	
a	2	3	93	2	—	—	—	—	—	—	—	—	100
b	—	—	52	40	7	1	—	—	—	—	—	—	100
c	—	—	11	64	13	9	3	—	—	—	—	—	100
d	—	3	5	52	32	7	1	—	—	—	—	—	100
e	—	2	2	11	38	15	11	1	—	—	—	—	100
f	—	—	3	4	28	43	16	5	1	—	—	—	100
g	—	—	1	3	4	48	31	11	2	—	—	—	100
h	—	—	1	3	4	18	51	18	4	1	—	—	100
i	—	—	—	2	2	6	41	34	11	4	—	—	100
j	—	—	—	2	2	6	24	40	13	9	4	—	100
k	—	—	—	1	3	3	10	37	29	13	3	1	100

Aniline from Benzol marked	Range of Temperature, Degrees C.										Total Distillate.
	Below 180	180 185	185 190	190 195	195 200	200 205	205 210	210 215	215 220	220 225	
a	5	92	3	—	—	—	—	—	—	—	100
b	4	78	14	4	—	—	—	—	—	—	100
c	3	28	61	8	—	—	—	—	—	—	100
d	—	5	60	29	6	—	—	—	—	—	100
e	—	4	9	64	16	7	—	—	—	—	100
f	—	—	4	38	46	8	4	—	—	—	100
g	—	—	—	5	54	29	8	4	—	—	100
h	—	—	—	4	32	53	7	4	—	—	100
i	—	—	—	—	5	62	24	6	3	—	100
j	—	—	—	—	4	25	50	15	6	—	100
k	—	—	—	—	—	6	52	29	8	5	100

TABLE SHOWING THE TENSION OF THE VAPOUR OF PETROLEUM OF GOOD QUALITY, FREE FROM PRODUCTS WITH DENSITY BELOW ·73 AND ABOVE ·82.

Temp. °C.	Tension in mm. of Water.	Temp. °C.	Tension in mm. of Water.	Temp. °C.	Tension in mm. of Water.
0	34·5	12	57	24	95
1	36	13	59	25	100
2	37·5	14	61·5	26	105
3	39	15	64	27	110
4	41	16	67	28	116
5	43	17	70	29	122
6	45	18	73	30	129
7	47	19	76	31	136
8	49	20	79	32	144
9	51	21	82·5	33	153
10	53	22	86	34	163
11	55	23	90	35	174

TABLE FOR THE APPROXIMATE DETERMINATION OF THE COMPOSITION OF MILK BY THE LACTODENSIMETER (QUEVENNE).

Water added.	Degree of Milk, Unskimmed.	Degree of Milk, Skimmed.	Water added.	Degree of Milk, Unskimmed.	Degree of Milk, Skimmed.
0	33–29	36·5–32·5	$\frac{3}{10}$	23–20	26·23
$\frac{1}{10}$	29–26	32·5–29	$\frac{4}{10}$	20–17	23·19
$\frac{2}{10}$	26–23	29–26	$\frac{5}{10}$	17–14	19·16

TABLE FOR THE CORRECTION OF THE DEGREES OF THE LACTODENSIMETER (QUEVENNE) FOR TEMPERATURE.

(The instrument is adjusted to 15° C.)

Degrees of Instrument.	Unskimmed Milk. Temperature.				Skimmed Milk. Temperature.			
	5° C.	10° C.	20° C.	25° C.	5° C.	10° C.	20° C.	25° C.
15	−0·9	−0·6	+0·8	+1·8				
20	1·1	0·7	0·9	1·9	−0·7	−0·5	+0·8	+1·7
22	1·2	0·7	1·0	2·1	0·7	0·5	0·8	1·7
24	1·2	0·7	1·0	2·1	0·9	0·6	0·8	1·7
26	1·3	0·8	1·1	2·2	1·0	0·7	0·8	1·8
28	1·4	0·9	1·2	2·4	1·0	0·7	0·9	1·9
30	1·6	1·0	1·2	2·5	1·1	0·7	0·9	1·9
32	1·7	1·0	1·3	2·7	1·1	0·7	1·0	2·1
34	1·9	1·1	1·3	2·8	1·2	0·8	1·0	2·2

TABLE SHOWING THE COMPOSITION OF TALLOW BY THE FUSION POINT.

4 per cent. is deducted for Glycerine, and 1 per cent. for Moisture, Impurity, &c.

Fusion Point °C.	Per cent. of Stearic Acid.	Per cent. of Oleic Acid.	Fusion Point °C.	Per cent. of Stearic Acid.	Per cent of Oleic Acid.
40	35·15	59·85	45·5	52·25	42·75
40·5	36·10	58·90	46	53·20	41·80
41	38	57	46·5	55·10	39·90
41·5	38·95	56·05	47	57·95	37·05
42	39·90	55·10	47·5	58·90	36·10
42·5	42·75	52·25	48	61·75	33·25
43	43·70	51·30	48·5	66·50	28·50
43·5	44·65	50·35	49	71·25	23·75
44	47·50	47·50	49·5	71·20	22·80
44·5	49·50	45·60	50	75·05	19·95
45	51·30	43·70			

QUANTITIES CORRESPONDING TO VARIOUS SALTS, &C., USED IN PHOTOGRAPHY.

Silver.	Nitrate.	Chloride.	Bromide.	Iodine.
1·	1·574	1·328	1·744	2·176
0·6353	1·	0·844	1·106	1·382
0·7528	1·185	1·	1·310	1·638
0·5744	0·904	0·763	1·	1·250
0·4595	0·723	0·610	0·800	1·

Gold.	Chloride.	Chloride of Gold and Potassium.	Chloride of Gold and Sodium.
1·	1·542	2·1048	2·0229
0·6485	1·	1·3650	1·3119
0·4751	0·7326	1·	0·9611
0·4943	0·7623	1·0405	1·

Bromine.	Ammonium Bromide.	Potassium Bromide.	Sodium Bromide.	Cadmium Bromide (4 Aq).	Zinc Bromide.
1·	1·225	1·488	1·1287	2·150	1·406
0·816	1·	1·214	1·055	1·754	1·147
0·672	0·823	1·	0·865	1·445	0·945
0·772	0·952	1·156	1·	1·671	1·092
0·465	0·570	0·692	0·559	1·	0·654
0·711	0·871	1·058	0·915	1·529	1·

Iodine.	Ammonium Iodide.	Potassium Iodide.	Sodium Iodide.	Cadmium Iodide.	Zinc Iodide.
1·	1·142	1·307	1·181	1·441	1·255
0·876	1·	1·145	1·035	1·262	1·099
0·765	0·874	1·	0·903	1·102	0·960
0·847	0·967	1·107	1·	1·220	1·063
0·694	0·793	0·907	0·820	1·	0·871
0·797	0·910	1·042	0·941	1·148	1·

List of the Prices of most Important Apparatus.

		s.	d.		s.	d.
Assay Apparatus—						
Anvils	each	1	6	to	15	0
Cupels	per doz.	0	6	,,	10	0
Hammers	each	1	0	,,	3	6
Mallets	,,	2	0	,,	4	0
Pliers	,,	1	6	,,	2	6
Scorifiers, 2½ in. diam.	per doz.	2	6			
Scoops, copper	each	2	6	,,	5	6
Shears	,,	2	0	,,	4	6
Vices	,,	5	0	,,	15	0
Balances—						
Chemical	,,	3 to 18 guineas				
Assay	,,	3 ,, 18 ,,				
Grain weights—						
From 10,000 grains to ·01 grain	per set				£3 12s.	
,, 600 ,, ,, ·01 ,,	,,				£1 10s.	
Gram weights, 1 kilo. to 1 milligram	,,				£3 15s.	
		s.	d.		s.	d.
Balances, Apothecaries	each	2	6	to	30	0
Basins, Porcelain—		Berlin.			German.	
2¾ inch diam.	per doz.	4	0			
4 ,,	,,	10	6		4	3
6 ,,	,,	21	0		10	0
10 ,,	,,	54	0			
14 ,,	,,	100	0			
Beakers, Bohemian glass	,,	1	9	to	19	0
Bell glasses, 6 × 5¾ to 12 × 10½	each	2	9	,,	7	6
Blowpipes—						
Black's tin	,,	0	9			
Brass	,,	1	6			
Common brass	,,	0	6			
Bottles—						
White English flint glass, ¼ oz. to 80 oz. capacity	per doz.	3	6	to	36	0
White Bohemian glass, ½ oz. to 40 oz. capacity	,,	1	6	,,	5	6
Burettes, Mohr's—						
With Indiarubber tube and glass jet, 20 c.c. to 50 c.c.	each	1	10	,,	3	2
With glass stopcock, 50 c.c. in 250 div.	,,	5	0			
,, ,, ,, 500 div.	,,	5	6			

List of the Prices of most Important Apparatus—*continued.*

Item	Unit	s.	d.		s.	d.
Burette stands	each	2	6	to	7	6
Caoutchouc stoppers, $\frac{3}{8}$ in. to $2\frac{1}{2}$ in. diam., solid	,,	0	2	,,	2	0
Chloride calcium tubes, U shaped	,,	0	9			
Clips, watch glass, flat brass	,,	0	4			
Cobalt glasses	per doz.	2	9			
Condensers, Liebig's, glass	each	2	6	,,	3	0
Corks	per gross	4	0	,,	12	0
Cork borers	per set	0	10	,,	6	0
Crucibles—						
$\frac{1}{8}$ oz. to 8 oz. cap, Berlin	per doz.	2	9	,,	16	6
,, ,, Meissen	,,	3	9	,,	16	0
Eudiometers, Bunsen's, 250 mm., 800 mm.	each	3	6	,,	6	6
Filter paper—						
English	per quire	1	0			
Swedish	,,	4	0			
Flasks, Bohemian, hard glass—						
1 oz. to 320 oz. cap	each	0	3	,,	4	0
Funnels, glass—						
1 in. to 10 in. diam., Bohemian ..	per doz.	2	6	,,	34	0
1 ,, ,, 6 ,, ,, English ..	,,	1	6	,,	9	0
Furnaces, combustion, gas—						
14 in. to 30 in. long	each	£3 3s. to £6				
Gas bags	,,	21	0	to	50	0
Glass tubing—						
Soft	per lb.	1	0			
Hard	,,	1	4			
Lamps, Bunsen's	each	1	3	,,	3	6
Mortars and pestles, agate—						
$1\frac{1}{2}$ in. to 5 in. diam.	,,	4	0	,,	63	0
Mortars and pestles, Wedgewood—						
2 in. to 12 in. diam.	,,	0	10	,,	18	6
Mortars and pestles, Berlin semi-porcelain—						
2 in. to 5 in. diam.	each	0	5	,,	1	9
Muffles—						
$7 \times 3\frac{1}{2}$ in. to 10×6 in.	,,	2	3	,,	4	0
Pipettes, plain cylinders	,,	0	3	,,	0	6
Pipettes, graduated—						
1 c.c. to 100 c.c. cap	,,	0	4	,,	1	3
Pneumatic troughs	,,	2	6	,,	8	0

LIST OF THE PRICES OF MOST IMPORTANT APPARATUS—*continued.*

		s.	d.		s.	d.
Retorts—						
2 oz. to 100 oz. cap, plain	each	0	3	to	1	6
„ „ tubul.	„	0	4	„	2	0
Retort stands—						
13 in. to 24 in. high	„	2	0	„	8	0
Sand baths, iron—						
4 in. to 12 in. diam.	„	0	4	„	1	0
Spatulas, steel	„	0	7	„	1	3
Sulphuretted hydrogen apparatus—						
Kipps	„	7	6	„	12	0
Test tubes—						
Sizes 2 × ¼ to 10 × 2	per doz.	0	3	„	3	6
Test-tube brushes	each	0	2			
Test-tube stands, with pegs—						
6 to 24 holes	„	1	0	„	3	6
Tongs, crucible, iron—						
6 in. to 21 in. long..	per pair	1	0	„	3	6
Tongs, crucible, brass—						
6 in. long	„	1	6			
9 in. long	„	1	9			
Wash bottles	each	1	0	„	2	0
Wash bottles, Bayley's—						
For continuous jet	„	3	6	„	4	6
Watch glasses—						
1½ in. to 3 in. diam.	per doz.	0	9	„	5	0
Water baths, copper, with 4 rings—						
30 oz.	each	8	0			
60 oz.	„	10	6			
Weighing bottles	„	0	3	„	1	0
Wire gauze	per sq. foot	1	0			
Woulffe's bottles—						
5 oz. to 320 oz. capacity, 2 necks	each	0	9	„	10	0
„ „ „ 3 necks	„	1	0	„	12	0

Wages Table.

Wages Per Year.	= Approximately.												
	Per Half Year.			Per Quarter Year.			Per Month.			Per Week.		Per Day.	
£	£	s.	d.	£	s.	d.	£	s.	d.	s.	d.	s.	d.
1	0	10	0	0	5	0	0	1	8	0	4½	0	0¾
2	1	0	0	0	10	0	0	3	4	0	9¼	0	1¼
3	1	10	0	0	15	0	0	5	0	1	1¾	0	2
4	2	0	0	1	0	0	0	6	8	1	6½	0	2¾
5	2	10	0	1	5	0	0	8	4	1	11	0	3¼
6	3	0	0	1	10	0	0	10	0	2	3¾	0	4
7	3	10	0	1	15	0	0	11	8	2	8¼	0	4½
8	4	0	0	2	0	0	0	13	4	3	1	0	5¼
9	4	10	0	2	5	0	0	15	0	3	5½	0	6
10	5	0	0	2	10	0	0	16	8	3	10¼	0	6½
11	5	10	0	2	15	0	0	18	4	4	2¾	0	7¼
12	6	0	0	3	0	0	1	0	0	4	7¼	0	8
13	6	10	0	3	5	0	1	1	8	5	0	0	8½
14	7	0	0	3	10	0	1	3	4	5	4½	0	9¼
15	7	10	0	3	15	0	1	5	0	5	9¼	0	9¾
16	8	0	0	4	0	0	1	6	8	6	1¾	0	10½
17	8	10	0	4	5	0	1	8	4	6	6½	0	11¼
18	9	0	0	4	10	0	1	10	0	6	11	0	11¾
19	9	10	0	4	15	0	1	11	8	7	3¾	1	0½
20	10	0	0	5	0	0	1	13	4	7	8¼	1	1¼
25	12	10	0	6	5	0	2	1	8	9	7¼	1	4½
30	15	0	0	7	10	0	2	10	0	11	6½	1	7¾
35	17	10	0	8	15	0	2	18	4	13	5½	1	11
40	20	0	0	10	0	0	3	6	8	15	4½	2	2¼
45	22	10	0	11	5	0	3	15	0	17	3¾	2	5½
50	25	0	0	12	10	0	4	3	4	19	2¾	2	9

English Coins.

A pound sterling consists of gold .. 113·001 grains.
" " copper .. 10·273 "
or a fineness of ·916⅔.
Total weight .. .. 123·274 "

1 shilling =87·273 grains. | 12 pence.. .. =¼ lb. avoir.
20 shillings= 3·636 oz. troy. | Or pence in £ =5 lbs. "

1 lb. troy (37 silver to 3 alloy) =66*s*.

Copper Coinage.—A lb. avoir. of copper is coined into 24 pence or 48 halfpence.

Bronze Coinage.—95 copper, 4 tin, 1 zinc, is coined into 40 pence, 80 halfpence, 160 farthings.

Ready Reckoner.

1	2		3		4		5		6		7		8		9		10	
d.	*s.*	*d.*	*s.*	*d.*	*s.*	*d.*	*s.*	*d.*	*s.*	*d.*	*s.*	*d.*	*s.*	*d.*	*s.*	*d.*	*s.*	*d.*
¼	0	0½	0	0¾	0	1	0	1¼	0	1½	0	1¾	0	2	0	2¼	0	2½
½	0	1	0	1½	0	2	0	2½	0	3	0	3½	0	4	0	4½	0	5
¾	0	1½	0	2¼	0	3	0	3¾	0	4½	0	5¼	0	6	0	6¾	0	7½
1	0	2	0	3	0	4	0	5	0	6	0	7	0	8	0	9	0	10
1¼	0	2½	0	3¾	0	5	0	6¼	0	7½	0	8¾	0	10	0	11¼	1	0½
1½	0	3	0	4½	0	6	0	7½	0	9	0	10½	1	0	1	1½	1	3
1¾	0	3½	0	5¼	0	7	0	8¾	0	10½	1	0¼	1	2	1	3¾	1	5½
2	0	4	0	6	0	8	0	10	1	0	1	2	1	4	1	6	1	8
2¼	0	4½	0	6¾	0	9	0	11¼	1	1½	1	3¾	1	6	1	8¼	1	10½
2½	0	5	0	7½	0	10	1	0½	1	3	1	5½	1	8	1	10½	2	1
2¾	0	5½	0	8¼	0	11	1	1¾	1	4½	1	7¼	1	10	2	0¾	2	3½
3	0	6	0	9	1	0	1	3	1	6	1	9	2	0	2	3	2	6
3¼	0	6½	0	9¾	1	1	1	4¼	1	7½	1	10¾	2	2	2	5¼	2	8½
3½	0	7	0	10½	1	2	1	5½	1	9	2	0½	2	4	2	7½	2	11
3¾	0	7½	0	11¼	1	3	1	6¾	1	10½	2	2¼	2	6	2	9¾	3	1½
4	0	8	1	0	1	4	1	8	2	0	2	4	2	8	2	0	3	4
4¼	0	8½	1	0¾	1	5	1	9¼	2	1½	2	5¾	2	10	3	2¼	3	6½
4½	0	9	1	1½	1	6	1	10½	2	3	2	7½	3	0	3	4½	3	9
4¾	0	9½	1	2¼	1	7	1	11¾	2	4½	2	9¼	3	2	3	6¾	3	11½
5	0	10	1	3	1	8	2	1	2	6	2	11	3	4	3	9	4	2
5¼	0	10½	1	3¾	1	9	2	2¼	2	7½	3	0¾	3	6	3	11¼	4	4½
5½	0	11	1	4½	1	10	2	3½	2	9	3	2½	3	8	4	1½	4	7
5¾	0	11½	1	5¼	1	11	2	4¾	2	10½	3	4¼	3	10	4	3¾	4	9½
6	1	0	1	6	2	0	2	6	3	0	3	6	4	0	4	6	5	0
6¼	1	0½	1	6¾	2	1	2	7¼	3	1½	3	7¾	4	2	4	8¼	5	2½
6½	1	1	1	7½	2	2	2	8½	3	3	3	9½	4	4	4	10½	5	5
6¾	1	1½	1	8¼	2	3	2	9¾	3	4½	3	11¼	4	6	5	0¾	5	7½
7	1	2	1	9	2	4	2	11	3	6	4	1	4	8	5	3	5	10
7¼	1	2½	1	9¾	2	5	3	0¼	3	7½	4	2¾	4	10	5	5¼	6	0½
7½	1	3	1	10½	2	6	3	1½	3	9	4	4½	5	0	5	7½	6	3
7¾	1	3½	1	11¼	2	7	3	2¾	3	10½	4	6¼	5	2	5	9¾	6	5½
8	1	4	2	0	2	8	3	4	4	0	4	8	5	4	6	0	6	8
8¼	1	4½	2	0¾	2	9	3	5¼	4	1½	4	9¾	5	6	6	2¼	6	10½
8½	1	5	2	1½	2	10	3	6½	4	3	4	11½	5	8	6	4½	7	1
8¾	1	5½	2	2¼	2	11	3	7¾	4	4½	5	1¼	5	10	6	6¾	7	3½
9	1	6	2	3	3	0	3	9	4	6	5	3	6	0	6	9	7	6
9¼	1	6½	2	3¾	3	1	3	10¼	4	7½	5	4¾	6	2	6	11¼	7	8½
9½	1	7	2	4½	3	2	3	11½	4	9	5	6½	6	4	7	1½	7	11
9¾	1	7½	2	5¼	3	3	4	0¾	4	10½	5	8¼	6	6	7	3¾	8	1½
10	1	8	2	6	3	4	4	2	5	0	5	10	6	8	7	6	8	4
10¼	1	8½	2	6¾	3	5	4	3¼	5	1½	5	11¾	6	10	7	8¼	8	6½
10½	1	9	2	7½	3	6	4	4½	5	3	6	1½	7	0	7	10½	8	9
10¾	1	9½	2	8¼	3	7	4	5¾	5	4½	6	3¼	7	2	8	0¾	8	11½
11	1	10	2	9	3	8	4	7	5	6	6	5	7	4	8	3	9	2
11¼	1	10½	2	9¾	3	9	4	8¼	5	7½	6	6¾	7	6	8	5¼	9	4½
11½	1	11	2	10½	3	10	4	9½	5	9	6	8½	7	8	8	7½	9	7
11¾	1	11½	2	11¼	3	11	4	10¾	5	10½	6	10¼	7	10	8	9¾	9	9½

THE ELEMENTS ARRANGED BY MENDELEJEFF ACCORDING TO NEWLAND'S (PERIODIC) CLASSIFICATION.

Even.									
I.	II.	III.	IV.	V.	VI.	VII.	VIII.		
Li 7·01	Be 9·0	B 11·0	C 11·97	N 14·01	O 15·96	Fl 19·1			
K 39·04	Ca 39·9	—	Ti 48·0	V 51·2	Cr 52·4	Mn 54·8	Fe 55·9	Co 58·6	Ni 58·6
Rb 85·2	Sr 87·2	Yt 93·0	Zr 90·0	Nb 94·0	Mo 95·6	—	Ru 85·2	Rh 104·1	Pd 106·2
Cs 133·0	Ba 136·8	La 139·0	Ce 141·2	—	—	—	—	—	—
—	—	Er 169·0	Di 147·0	Ta 182·0	W 184·0	—	Os 198·6	Ir 196·7	Pt 196·7
—	—	—	Th 231·5	—	Ur 240·0	—	—	—	—
R_2O	RO	R_2O_3	RO_2	R_2O_5	RO_3	R_2O_7	RO_4		

THE ELEMENTS ARRANGED BY MENDELEJEFF ACCORDING TO NEWLAND'S (PERIODIC) CLASSIFICATION—*continued.*

			Odd.						
VIII.			I.	II.	III.	IV.	V.	VI.	VII.
			H 1						
			Na 22·96	Mg 23·94	Al 27·3	Si 28·0	P 30·96	S 31·98	Cl 35·37
Fe 55·9	Co 58·6	Ni 58·6	Cu 63·0	Zn 64·9	Ga 68	—	As 74·9	Se 78·0	Br 79·75
Ru 85·2	Rh 104·1	Pd 106·2	Ag 107·66	Cd 111·6	In 113·4	Sn 117·8	Sb 122·0	Te 128·0	I 126·53
—	—	—	—	—	—	—	—	—	—
Os 198·6	Ir 196·7	Pt 196·7	Au 196·2	Hg 199·8	Tl 203·6	Pb 206·4	Bi 210·0	—	—
—	—	—	—	—	—	—	—	—	—
RO_4			R_2O	RO	R_2O_3	RO_2	R_2O_5	RO_3	R_2O_7

USEFUL DATA.

Formulæ for Alcohol (Allen).

W = Per cent. of alcohol by weight.
D = Density of liquid.
V = Per cent. of alcohol by volume.
P = Per cent. of proof spirit by volume.

(1) $V = P \times 0 \cdot 5706.$

(2) $V = \frac{WD}{0 \cdot 7938}.$

(3) $P = \frac{V}{0 \cdot 5706} = V \times 1 \cdot 7525.$

(4) $P = WD \times 2 \cdot 208.$

Formulæ for Beer and Wort (Allen).

D = Density at 60° F. (water = 1000).

$E = D - 1000.$

$E \times \cdot 36 =$ saccharometer gravity.

$$\frac{\text{Sacch. gravity}}{\cdot 36} = E.$$

$$\frac{\text{Sacch. gravity}}{\cdot 36} + 1000 = D.$$

$$\text{Twaddell} \times 5 = E.$$

$$\text{Twaddell} \times 5 + 1000 = D.$$

$$\frac{14{,}800}{148 - \text{Beaumé}} = D.$$

$\frac{E}{3 \cdot 85}$ = lbs. solid extract per 10 gallons.

$E \times \cdot 26$ = lbs. solid extract per 10 gallons.

$\frac{E \times 260}{D}$ = lbs. solid extract per 100 lbs. of wort.

$E \times \cdot 935$ = lbs. solid extract per barrel.

For Correction of Density for Temperature.

d = observed density of hot wort.

t = temperature of hot wort (Fahr.).

$$d - 1000 = e.$$

$$t - 60^\circ \text{ F.} = f.$$

$$D = \left(1 + \frac{4e}{1000} + \frac{f}{100}\right)\frac{f}{10} + d.$$

Corrections of densities of solutions of cane sugar for temperature may be made by the same method.

TABLE SHOWING THE STRENGTH OF SOLUTION OF AMMONIA BY SPECIFIC GRAVITY (WACHSMUTH).

Specific Gravity at 12° C.	1 Kilo. contains Ammonia in Grams.	1 Litre contains Ammonia in Grams.	1 Litre consists of	
			Water in C.C.	Liquid Ammonia in C.C.
870	384·4	334·5	535·4	464·5
872	376·9	328·6	543·4	456·6
874	369·4	322·8	551·2	448·8
876	362·0	317·1	558·9	441·1
878	354·6	311·3	566·7	433·3
880	347·2	305·5	574·5	425·5
882	340·0	299·8	582·2	417·8
884	332·9	294·2	589·8	410·2
886	325·8	288·6	597·4	402·6
888	318·7	283·0	605·0	395·0
890	311·6	277·3	612·7	387·3
892	304·7	271·7	620·3	379·7
894	297·8	266·2	627·8	372·2
896	290·9	260·6	635·4	364·6
898	284·1	255·1	642·9	357·1
900	277·3	249·5	650·5	349·5
902	270·7	244·1	657·9	342·1
904	264·1	238·7	665·3	334·7
906	257·7	233·4	672·6	327·4
908	251·3	228·2	679·8	320·2
910	244·9	222·8	687·2	312·8
912	238·6	217·6	694·4	305·6
914	232·3	212·3	701·7	298·3
916	226·0	207·0	709·0	291·0
918	219·7	201·6	716·4	283·6
920	213·4	196·3	723·7	276·3
922	207·3	191·1	730·9	269·1
924	201·2	185·9	738·1	261·9
926	195·1	180·6	745·4	254·6
928	189·0	175·4	752·6	247·4

TABLE SHOWING THE STRENGTH OF SOLUTION OF AMMONIA BY SPECIFIC GRAVITY—*continued.*

Specific Gravity at 12° C.	1 Kilo. contains Ammonia in Grams.	1 Litre contains Ammonia in Grams.	1 Litre consists of	
			Water in C.C.	Liquid Ammonia in C.C.
930	182·9	170·1	759·9	240·1
932	176·9	164·8	767·2	232·8
934	170·9	159·6	774·4	225·6
936	164·9	154·3	781·7	218·3
938	158·9	149·0	789·0	211·0
940	152·9	143·7	796·3	203·7
942	147·1	138·5	803·5	196·5
944	141·3	133·3	810·7	189·3
946	135·6	128·2	817·8	182·2
948	129·9	123·1	824·9	175·1
950	124·2	118·0	832·0	168·0
952	118·7	113·0	839·0	161·0
954	113·2	108·0	846·0	154·0
956	107·8	103·0	853·0	147·0
958	102·4	98·1	859·9	140·1
960	97·0	93·1	866·9	133·1
962	91·6	88·1	873·9	126·1
964	86·2	83·0	881·0	119·0
966	80·8	78·0	888·0	112·0
968	75·5	73·0	895·0	105·0
970	70·2	68·0	902·0	98·0
972	65·2	63·3	908·7	91·3
974	60·2	58·6	915·4	84·6
976	55·2	53·8	922·2	77·8
978	50·2	49·1	928·9	71·1
980	45·3	44·3	935·7	64·3
982	40·4	39·6	942·4	57·6
984	35·5	34·9	949·1	50·9
986	30·6	30·1	955·9	44·1
988	25·8	25·5	962·5	37·5
990	21·0	20·7	969·3	30·7

Per cent. Anhydrous Glycerine.	Specific Gravity at 12–14° C.	Per cent. Anhydrous Glycerine.	Specific Gravity at 12–14° C.	Per cent. Anhydrous Glycerine.	Specific Gravity at 12–14° C.	Per cent. Anhydrous Glycerine.	Specific Gravity at 12–14° C.
100	1·2691	75	1·2016	50	1·1320	25	1·0635
99	1·2664	74	1·1999	49	1·1293	24	1·0608
98	1·2637	73	1·1973	48	1·1265	23	1·0580
97	1·2610	72	1·1945	47	1·1238	22	1·0553
96	1·2584	71	1·1918	46	1·1210	21	1·0525
95	1·2557	70	1·1889	45	1·1183	20	1·0498
94	1·2531	69	1·1858	44	1·1155	19	1·0471
93	1·2504	68	1·1826	43	1·1127	18	1·0446
92	1·2478	67	1·1795	42	1·1100	17	1·0422
91	1·2451	66	1·1764	41	1·1072	16	1·0398
90	1·2425	65	1·1733	40	1·1045	15	1·0374
89	1·2398	64	1·1702	39	1·1017	14	1·0349
88	1·2372	63	1·1671	38	1·0989	13	1·0322
87	1·2345	62	1·1640	37	1·0962	12	1·0297
86	1·2318	61	1·1610	36	1·0934	11	1·0271
85	1·2292	60	1·1582	35	1·0907	10	1·0245
84	1·2265	59	1·1556	34	1·0880	9	1·0221
83	1·2238	58	1·1530	33	1·0852	8	1·0196
82	1·2212	57	1·1505	32	1·0825	7	1·0172
81	1·2185	56	1·1480	31	1·0798	6	1·0147
80	1·2159	55	1·1455	30	1·0771	5	1·0123
79	1·2132	54	1·1430	29	1·0744	4	1·0098
78	1·2106	53	1·1403	28	1·0716	3	1·0074
77	1·2079	52	1·1375	27	1·0689	2	1·0049
76	1·2042	51	1·1348	26	1·0663	1	1·0025

Table showing the Boiling Points of Saturated Solutions.

Salt in Solution.	Boiling Point °C.	Salt per 100 of Water.
Potassium acetate ..	169	800
Sodium ,, ..	124·4	209
Potassium carbonate ..	135	205
Sodium ,, ..	104·6	48·5
Ammonium chloride ..	114·2	89
Barium ,, ..	104·4	60
Calcium ,, ..	179·5	325
Potassium ,, ..	108·4	59·4
Sodium ,, ..	108·4	40·2
Ammonium nitrate ..	164	209
Calcium ,, ..	151	362
Potassium ,, ..	116	335
Sodium phosphate ..	106·6	112·6

TABLE I.—FOR CALCULATING THE VALUE OF CUBIC CENTIMETERS WITH DIFFERENT CORRECTIONS (WORRALL).

These tables are for use in volumetric analysis when standard solutions are used which are not exactly normal or decinormal. The "factor" is given at the head of the columns, and the numbers representing the cubic centimeters at the left-hand side. Thus suppose the solution to be weak, and its factor to be ·915, if 20 cubic centimeters have been used, the real value is 18·3.

	·900	·905	·910	·915	·920	·925	·930	·935	·940	·945
2	1·8	1·81	1·82	1·83	1·84	1·85	1·86	1·87	1·88	1·89
3	2·7	2·715	2·73	2·745	2·76	2·775	2·79	2·805	2·82	2·835
4	3·6	3·62	3·64	3·66	3·68	3·7	3·72	3·74	3·76	3·78
5	4·5	4·525	4·55	4·575	4·6	4·625	4·65	4·675	4·7	4·725
6	5·4	5·43	5·46	5·49	5·52	5·55	5·58	5·61	5·64	5·67
7	6·3	6·335	6·37	6·405	6·44	6·475	6·51	6·545	6·58	6·615
8	7·2	7·24	7·28	7·32	7·36	7·4	7·44	7·48	7·52	7·56
9	8·1	8·145	8·19	8·235	8·28	8·325	8·37	8·415	8·46	8·505
10	9·	9·05	9·1	9·15	9·2	9·25	9·3	9·35	9·4	9·45
11	9·9	9·955	10·01	10·065	10·12	10·175	10·23	10·285	10·34	10·395
12	10·8	10·86	10·92	10·98	11·04	11·1	11·16	11·22	11·28	11·34
13	11·7	11·765	11·83	11·895	11·96	12·025	12·09	12·155	12·22	12·285
14	12·6	12·67	12·74	12·81	12·88	12·95	13·02	13·09	13·16	13·23
15	13·5	13·575	13·65	13·725	13·8	13·875	13·95	14·025	14·1	14·175
16	14·4	14·48	14·56	14·64	14·72	14·8	14·88	14·96	15·04	15·12
17	15·3	15·385	15·47	15·555	15·64	15·725	15·81	15·895	15·98	16·065
18	16·2	16·29	16·38	16·47	16·56	16·65	16·74	16·83	16·92	17·01
19	17·1	17·195	17·29	17·385	17·48	17·575	17·67	17·765	17·86	17·955
20	18·	18·1	18·2	18·3	18·4	18·5	18·6	18·7	18·8	18·9
21	18·9	19·005	19·11	19·215	19·32	19·425	19·53	19·635	19·74	19·845
22	19·8	19·91	20·02	20·13	20·24	20·35	20·46	20·57	20·68	20·79
23	20·7	20·815	20·93	21·045	21·16	21·275	21·39	21·505	21·62	21·735

TABLE I.—FOR CALCULATING THE VALUE OF CUBIC CENTIMETERS, &c.—*continued.*

	·950	·955	·960	·965	·970	·975	·980	·985	·990	·995
2	1·9	1·91	1·92	1·93	1·94	1·95	1·96	1·97	1·98	1·99
3	2·85	2·865	2·88	2·895	2·91	2·925	2·94	2·955	2·97	2·985
4	3·8	3·82	3·84	3·86	3·88	3·9	3·92	3·94	3·96	3·98
5	4·75	4·775	4·8	4·825	4·85	4·875	4·9	4·925	4·95	4·975
6	5·7	5·73	5·76	5·79	5·82	5·85	5·88	5·91	5·94	5·97
7	6·65	6·685	6·72	6·755	6·79	6·825	6·86	6·895	6·93	6·965
8	7·6	7·64	7·68	7·72	7·76	7·8	7·84	7·88	7·92	7·96
9	8·55	8·595	8·64	8·685	8·73	8·775	8·82	8·865	8·91	8·955
10	9·5	9·55	9·6	9·65	9·7	9·75	9·8	9·85	9·9	9·95
11	10·45	10·505	10·56	10·615	10·67	10·725	10·78	10·835	10·89	10·945
12	11·4	11·46	11·52	11·58	11·64	11·7	11·76	11·82	11·88	11·94
13	12·35	12·415	12·48	12·545	12·61	12·675	12·74	12·805	12·87	12·935
14	13·3	13·37	13·44	13·51	13·58	13·65	13·72	13·79	13·86	13·93
15	14·25	14·325	14·4	14·475	14·55	14·625	14·7	14·775	14·85	14·925
16	15·2	15·28	15·36	15·44	15·52	15·6	15·68	15·76	15·84	15·92
17	16·15	16·235	16·32	16·405	16·49	16·575	16·66	16·745	16·83	16·915
18	17·1	17·19	17·28	17·37	17·46	17·55	17·64	17·73	17·82	17·91
19	18·05	18·145	18·24	18·335	18·43	18·525	18·62	18·715	18·81	18·905
20	19·	19·1	19·2	19·3	19·4	19·5	19·6	19·7	19·8	19·9
21	19·95	20·055	20·16	20·265	20·37	20·475	20·58	20·685	20·79	20·895
22	20·9	21·01	21·12	21·23	21·34	21·45	21·56	21·67	21·78	21·89
23	21·85	21·965	22·08	22·195	22·31	22·425	22·54	22·655	22·77	22·885

TABLE I. FOR CALCULATING THE VALUE OF CUBIC CENTIMETERS, &c.—*continued.*

	·900	·905	·910	·915	·920	·925	·930	·935	·940	·945
24	21·6	21·72	21·84	21·96	22·08	22·2	22·32	22·44	22·56	22·68
25	22·5	22·625	22·75	22·875	23·	23·125	23·25	23·375	23·5	23·625
26	23·4	23·53	23·66	23·79	23·92	24·05	24·18	24·31	24·44	24·57
27	24·3	24·435	24·57	24·705	24·84	24·975	25·11	25·245	25·38	25·515
28	25·2	25·34	25·48	25·62	25·76	25·9	26·04	26·18	26·32	26·46
29	26·1	26·245	26·39	26·535	26·68	26·825	26·97	27·115	27·26	27·405
30	27·	27·15	27·3	27·45	27·6	27·75	27·9	28·05	28·2	28·35
31	27·9	28·055	28·21	28·365	28·52	28·675	28·83	28·985	29·14	29·295
32	28·8	28·96	29·12	29·28	29·44	29·6	29·76	29·92	30·08	30·24
33	29·7	29·865	30·03	30·195	30·36	30·525	30·69	30·855	31·02	31·185
34	30·6	30·77	30·94	31·11	31·28	31·45	31·62	31·79	31·96	32·13
35	31·5	31·675	31·85	32·025	32·2	32·375	32·55	32·725	32·9	33·075
36	32·4	32·58	32·76	32·94	33·12	33·3	33·48	33·66	33·84	34·02
37	33·3	33·485	33·67	33·855	34·04	34·225	34·41	34·595	34·78	34·965
38	34·2	34·39	34·58	34·77	34·96	35·15	35·34	35·53	35·72	35·91
39	35·1	35·295	35·49	35·685	35·88	36·075	36·27	36·465	36·66	36·855
40	36·	36·2	36·4	36·6	36·8	37·	37·2	37·4	37·6	37·8
41	36·9	37·105	37·31	37·515	37·72	37·925	38·13	38·335	38·54	38·745
42	37·8	38·01	38·22	38·43	38·64	38·85	39·06	39·27	39·48	39·69
43	38·7	38·915	39·13	39·345	39·56	39·775	39·99	40·205	40·42	40·635
44	39·6	39·82	40·04	40·26	40·48	40·7	40·92	41·14	41·36	41·58
45	40·5	40·725	40·95	41·175	41·4	41·625	41·85	42·075	42·3	42·525
46	41·4	41·63	41·86	42·09	42·32	42·55	42·78	43·01	43·24	43·47
47	42·3	42·535	42·77	43·005	43·24	43·475	43·71	43·945	44·18	44·415
48	43·2	43·44	43·68	43·92	44·16	44·4	44·64	44·88	45·12	45·36
49	44·1	44·345	44·59	44·835	45·08	45·325	45·57	45·815	46·06	46·305
50	45·	45·25	45·5	45·75	46·	46·25	46·5	46·75	47·	47·25

TABLE I.—FOR CALCULATING THE VALUE OF CUBIC CENTIMETERS, &c.—*continued.*

	·950	·955	·960	·965	·970	·975	·980	·985	·990	·995
24	22·8	22·92	23·04	23·16	23·28	23·4	23·52	23·64	23·76	23·88
25	23·75	23·875	24·	24·125	24·25	24·375	24·5	24·625	24·75	24·875
26	24·7	24·83	24·96	25·09	25·22	25·35	25·48	25·61	25·74	25·87
27	25·65	25·795	25·92	26·055	26·19	26·325	26·46	26·595	26·73	26·865
28	26·6	26·75	26·88	27·02	27·16	27·3	27·44	27·58	27·72	27·86
29	27·55	27·705	27·84	27·985	28·13	28·275	28·42	28·565	28·71	28·855
30	28·5	28·66	28·8	28·95	29·1	29·25	29·4	29·55	29·7	29·85
31	29·45	29·615	29·76	29·915	30·07	30·225	30·38	30·535	30·69	30·845
32	30·4	30·57	30·72	30·88	31·04	31·2	31·36	31·52	31·68	31·84
33	31·35	31·515	31·68	31·845	32·01	32·175	32·34	32·505	32·67	32·835
34	32·3	32·47	32·64	32·81	32·98	33·15	33·32	33·49	33·66	33·83
35	33·25	33·425	33·6	33·775	33·95	34·125	34·3	34·475	34·65	34·825
36	34·2	34·38	34·56	34·74	34·92	35·1	35·28	35·46	35·64	35·82
37	35·15	35·335	35·52	35·705	35·89	36·075	36·26	36·446	36·63	36·815
38	36·1	36·29	36·48	36·67	36·86	37·05	37·24	37·43	37·62	37·81
39	37·05	37·245	37·44	37·635	37·83	38·025	38·22	38·415	38·61	38·805
40	38·	38·2	38·4	38·6	38·8	39·	39·2	39·4	39·6	39·8
41	38·95	39·155	39·36	39·565	39·77	39·975	40·18	40·385	40·59	40·795
42	39·9	40·11	40·32	40·53	40·74	40·95	41·16	41·37	41·58	41·79
43	40·85	41·065	41·28	41·495	41·71	41·925	42·14	42·355	42·57	42·785
44	41·8	42·02	42·24	42·46	42·68	42·9	43·12	43·34	43·56	43·78
45	42·75	42·975	43·2	43·425	43·65	43·875	44·1	44·325	44·55	44·775
46	43·7	43·93	44·16	44·39	44·62	44·85	45·08	45·31	45·54	45·77
47	44·65	44·885	45·12	45·355	45·59	45·825	46·06	46·295	46·53	46·765
48	45·6	45·84	46·08	46·32	46·56	46·8	47·04	47·28	47·52	47·76
49	46·55	46·795	47·04	47·285	47·53	47·775	48·02	48·265	48·51	48·755
50	47·5	47·75	48·	48·25	48·5	48·75	49·	49·25	49·5	49·75

TABLE II.—FOR CALCULATING THE VALUE OF CUBIC CENTIMETERS, &c.

	1·005	1·010	1·015	1·02	1·025	1·03	1·035	1·04	1·045	1·05
2	2·01	2·02	2·03	2·04	2·05	2·06	2·07	2·08	2·09	2·10
3	3·015	3·03	3·045	3·06	3·075	3·09	3·105	3·12	3·135	3·15
4	4·02	4·04	4·06	4·08	4·1	4·12	4·14	4·16	4·18	4·2
5	5·025	5·05	5·075	5·1	5·125	5·15	5·175	5·2	5·225	5·25
6	6·03	6·06	6·08	6·12	6·15	6·18	6·21	6·24	6·27	6·3
7	7·035	7·07	7·105	7·14	7·175	7·21	7·245	7·28	7·315	7·35
8	8·04	8·08	8·12	8·16	8·2	8·24	8·28	8·32	8·36	8·4
9	9·045	9·09	9·135	9·18	9·225	9·27	9·315	9·36	9·405	9·45
10	10·05	10·10	10·15	10·2	10·25	10·3	10·35	10·4	10·45	10·5
11	11·055	11·11	11·165	11·22	11·275	11·33	11·385	11·44	11·495	11·55
12	12·06	12·12	12·18	12·24	12·3	12·36	12·42	12·48	12·54	12·6
13	13·065	13·13	13·195	13·26	13·325	13·39	13·455	13·52	13·585	13·65
14	14·07	14·14	14·21	14·28	14·35	14·42	14·49	14·56	14·63	14·7
15	15·075	15·15	15·225	15·3	15·375	15·45	15·525	15·6	15·675	15·75
16	16·08	16·16	16·24	16·32	16·4	16·48	16·56	16·64	16·72	16·8
17	17·085	17·17	17·255	17·34	17·425	17·51	17·595	17·68	17·765	17·85
18	18·09	18·18	18·27	18·36	18·45	18·54	18·63	18·72	18·81	18·9
19	19·095	19·19	19·285	19·38	19·475	19·57	19·665	19·76	19·855	19·95
20	20·1	20·2	20·3	20·4	20·5	20·6	20·7	20·8	20·9	21·
21	21·105	21·21	21·315	21·42	21·525	21·63	21·735	21·84	21·945	22·05
22	22·11	22·22	22·33	22·44	22·55	22·66	22·77	22·88	22·99	23·1
23	23·115	23·23	23·345	23·46	23·575	23·69	23·805	23·92	24·035	24·15
24	24·12	24·24	24·36	24·48	24·6	24·72	24·84	24·96	25·08	25·2
25	25·125	25·25	25·375	25·5	25·625	25·75	25·875	26·	26·125	26·25

TABLE II.—FOR CALCULATING THE VALUE OF CUBIC CENTIMETERS, &C.—*continued.*

	1·055	1·06	1·065	1·07	1·075	1·08	1·085	1·09	1·095	1·1
2	2·11	2·12	2·13	2·14	2·15	2·16	2·17	2·18	2·19	2·2
3	3·165	3·18	3·195	3·21	3·225	3·24	3·255	3·27	3·285	3·3
4	4·22	4·24	4·26	4·28	4·3	4·32	4·34	4·36	4·38	4·4
5	5·275	5·3	5·325	5·35	5·375	5·4	5·425	5·45	5·475	5·5
6	6·33	6·36	6·39	6·42	6·45	6·48	6·51	6·54	6·57	6·6
7	7·385	7·42	7·455	7·49	7·525	7·56	7·595	7·63	7·665	7·7
8	8·44	8·48	8·52	8·56	8·6	8·64	8·68	8·72	8·76	8·8
9	9·495	9·54	9·585	9·63	9·675	9·72	9·765	9·81	9·855	9·9
10	10·55	10·6	10·65	10·7	10·75	10·8	10·85	10·9	10·95	11·
11	11·605	11·66	11·715	11·77	11·825	11·88	11·935	11·99	12·045	12·1
12	12·66	12·72	12·78	12·84	12·9	12·96	13·02	13·08	13·14	13·2
13	13·715	13·78	13·845	13·91	13·975	14·04	14·105	14·17	14·235	14·3
14	14·77	14·84	14·91	14·98	15·05	15·12	15·19	15·26	15·33	15·4
15	15·825	15·9	15·975	16·05	16·125	16·2	16·275	16·35	16·425	16·5
16	16·88	16·96	17·04	17·12	17·2	17·28	17·36	17·44	17·52	17·6
17	17·935	18·02	18·105	18·19	18·275	18·36	18·445	18·53	18·615	18·7
18	18·99	19·08	19·17	19·26	19·35	19·44	19·53	19·62	19·71	19·8
19	20·045	20·14	20·235	20·33	20·425	20·52	20·615	20·71	20·805	20·9
20	21·1	21·2	21·3	21·4	21·5	21·6	21·7	21·8	21·9	22·
21	22·155	22·26	22·365	22·47	22·575	22·68	22·785	22·89	22·995	23·1
22	23·21	23·32	23·43	23·54	23·65	23·76	23·87	23·98	24·09	24·2
23	24·265	24·38	24·495	24·61	24·725	24·84	24·955	25·07	25·185	25·3
24	25·32	25·44	25·56	25·68	25·8	25·92	26·04	26·16	26·28	26·4
25	26·375	26·5	26·625	26·75	26·875	27·	27·125	27·25	27·375	27·5

TABLE II.—FOR CALCULATING THE VALUE OF CUBIC CENTIMETERS, &c.—*continued.*

	1·005	1·010	1·015	1·02	1·025	1·03	1·035	1·04	1·045	1·05
26	26·13	26·26	26·39	26·52	26·65	26·78	26·91	27·04	27·17	27·3
27	27·135	27·27	27·405	27·54	27·675	27·81	27·945	28·08	28·215	28·35
28	28·14	28·28	28·42	28·56	28·7	28·84	28·98	29·12	29·26	29·4
29	29·145	29·29	29·435	29·58	29·725	29·87	30·015	30·16	30·305	30·45
30	30·15	30·3	30·45	30·6	30·75	30·9	31·05	31·2	31·35	31·5
31	31·155	31·31	31·465	31·62	31·775	31·93	32·085	32·24	32·395	32·55
32	32·16	32·32	32·48	32·64	32·8	32·96	33·12	33·28	33·44	33·6
33	33·165	33·33	33·495	33·66	33·825	33·99	34·155	34·32	34·485	34·65
34	34·17	34·34	34·51	34·68	34·85	35·02	35·19	35·36	35·53	35·7
35	35·175	35·35	35·525	35·7	35·875	36·05	36·225	36·4	36·575	36·75
36	36·18	36·36	36·54	36·72	36·9	37·08	37·26	37·44	37·62	37·8
37	37·185	37·37	37·555	37·74	37·925	38·11	38·295	38·48	38·665	38·85
38	38·19	38·38	38·57	38·76	38·95	39·14	39·33	39·52	39·71	39·9
39	39·195	39·39	39·585	39·78	39·975	40·17	40·365	40·56	40·755	40·95
40	40·2	40·4	40·6	40·8	41·	41·2	41·4	41·6	41·8	42·
41	41·205	41·41	41·615	41·82	42·025	42·23	42·435	42·64	42·845	43·05
42	42·21	42·42	42·63	42·84	43·05	43·26	43·47	43·68	43·89	44·1
43	43·215	43·43	43·645	43·86	44·075	44·29	44·505	44·72	44·935	45·15
44	44·22	44·44	44·66	44·88	45·1	45·32	45·54	45·76	45·98	46·2
45	45·225	45·45	45·675	45·9	46·125	46·35	46·575	46·8	47·025	47·25
46	46·23	46·46	46·69	46·92	47·15	47·38	47·61	47·84	48·07	48·3
47	47·235	47·47	47·705	47·94	48·175	48·41	48·645	48·88	49·115	49·35
48	48·24	48·48	48·72	48·96	49·2	49·44	49·68	49·92	50·16	50·4
49	49·245	49·49	49·735	49·98	50·225	50·47	50·715	50·96	51·205	51·45
50	50·25	50·5	50·75	51·	51·25	51·5	51·75	52·	52·25	52·5

TABLE II.—FOR CALCULATING THE VALUE OF CUBIC CENTIMETERS, &c.—*continued.*

	1·055	1·06	1·065	1·07	1·075	1·08	1·085	1·09	1·095	1·1
26	27·43	27·56	27·69	27·82	27·95	28·08	28·21	28·34	28·47	28·6
27	28·485	28·62	28·755	28·89	29·025	29·16	29·295	29·43	29·565	29·7
28	29·54	29·68	29·82	29·96	30·1	30·24	30·38	30·52	30·66	30·8
29	30·595	30·74	30·885	31·03	31·175	31·32	31·465	31·61	31·755	31·9
30	31·65	31·8	31·95	32·1	32·25	32·4	32·55	32·7	32·85	33·
31	32·705	32·86	33·015	33·17	33·325	33·48	33·635	33·79	33·945	34·1
32	33·76	33·92	34·08	34·24	34·4	34·56	34·72	34·88	35·04	35·2
33	34·815	34·98	35·145	35·31	35·475	35·64	35·805	35·97	36·135	36·3
34	35·87	36·04	36·21	36·38	36·55	36·72	36·89	37·06	37·23	37·4
35	36·925	37·1	37·275	37·45	37·625	37·8	37·975	38·15	38·325	38·5
36	37·98	38·16	38·34	38·52	38·7	38·88	39·06	39·24	39·42	39·6
37	39·035	39·22	39·405	39·59	39·775	39·96	40·145	40·33	40·515	40·7
38	40·09	40·28	40·47	40·66	40·85	41·04	41·23	41·42	41·61	41·8
39	41·145	41·34	41·535	41·73	41·925	42·12	42·315	42·51	42·705	42·9
40	42·2	42·4	42·6	42·8	43·	43·2	43·4	43·6	43·8	44·
41	43·255	43·46	43·665	43·87	44·075	44·28	44·485	44·69	44·895	45·1
42	44·31	44·52	44·73	44·94	45·15	45·36	45·57	45·78	45·99	46·2
43	45·365	45·58	45·795	46·01	46 225	46·44	46·655	46·87	47·085	47·3
44	46·42	46·64	46·86	47·08	47·3	47·52	47·74	47·96	48·18	48·4
45	47·475	47·7	47·925	48·15	48·375	48·6	48 825	49·05	49·275	49·5
46	48·53	48·76	48·99	49·22	49·45	49·68	49·91	50·14	50·37	50·8
47	49·585	49·82	50·055	50·29	50·525	50·76	50·995	51·23	51·465	51·7
48	50·64	50·88	51·12	51·36	51·6	51·84	52·08	52·32	52·56	52·8
49	51·695	51·94	52·185	52·43	52 675	52·92	53·165	53·41	53·655	53·9
50	52·75	53·	53·25	53·5	53·75	54·	54·25	54·5	54·75	55·

Magnesia Mixture.

Dissolve 83 grams of crystallized magnesium sulphate in boiling water, add 5 c. c. of hydrochloric acid, and then 82 grams of crystallized barium chloride previously dissolved in water. Filter off a few drops of the solution and add dilute sulphuric acid, if this gives a precipitate add a little more magnesium sulphate. Then decant and filter, mix the filtrate and washings, and concentrate by evaporation. When cool transfer to a litre flask, add 165 grams of pure ammonium chloride, 260 c. c. of ammonia, and then water to the mark. Allow to stand a few days and filter if necessary.

Dry Reagents.

Fusion Mixture. Mix 10 parts of anhydrous sodium carbonate with 13 parts of anhydrous potassium carbonate.

Blax Flux. Ignite Rochelle salt to redness in a covered crucible.

Soda Lime. Take caustic soda of known sp. gr. and calculate the weight of NaHO present, add twice the latter weight of good quicklime, allow the slaking to take place and evaporate to dryness in an iron dish. Heat the residue to redness in a crucible, and then reduce it to coarse powder by sifting.

Oxidizing Fusion Mixtures.

(1) Anhydrous sodium carbonate 6 parts, potassic nitrate 4 parts.

(2) Anhydrous sodium carbonate 6 to 8 parts, potassic chlorate 1 part

A TABLE OF THE ATOMIC WEIGHTS AS RE-CALCULATED BY F. W. CLARKE.

Symbol.	Name.	H = 1.		O = 16.	Remarks.
Al	Aluminium ..	27·009	± 0·003	27·075	
Sb	Antimony	119·955	„ 0·036	120·231	Cooke's and Schneider's data.
As	Arsenic	74·918	„ 0·016	75·090	
Ba	Barium	136·763	„ 0·031	137·007	
Bi	Bismuth	207·523	„ 0·082	208·001	Schneider's data.
B	Boron	10·941	„ 0·023	10·966	
Br	Bromine	79·768	„ 0·019	79·951	
Cd	Cadmium	111·835	„ 0·024	112·092	
Cs	Cæsium	132·583	„ 0·024	132·918	
Ca	Calcium	39·990	„ 0·010	40·082	
C	Carbon	11·9736	„ 0·0028	12·0011	
Ce	Cerium	140·424	„ 0·017	140·747	Buehrig's data give 141·523 O = 16.
Cl	Chlorine	35·370	„ 0·014	35·451	
Cr	Chromium	52·009	„ 0·025	52·129	Siewert's data.
Co	Cobalt	58·887	„ 0·008	59·023	
Nb	Columbium or Niobium	93·812	„ ..	94·027	From one ratio only.
Cu	Copper	63·173	„ 0·011	63·318	
Di	Didymium	142·121	„ ..	142·502	
Er	Erbium	165·891	„ ..	166·273	From Cleve's data only.
F	Fluorine	18·984	„ 0·0065	19·027	
Ga	Gallium	68·854	„ ..	68·963	Imperfectly determined.

A TABLE OF THE ATOMIC WEIGHTS, &c.—*continued.*

Symbol.	Name.	H = 1.		O = 16.	Remarks.
Be	Glucinum	9·085	± 0·0055	9·106	Nilson and Petterson's data.
Au	Gold	196·155	„ 0·095	196·606	Imperfectly determined.
H	Hydrogen	1·000	„ ..	1·0023	
In	Indium	113·398	„ 0·047	113·659	Imperfectly determined.
I	Iodine	126·557	„ 0·022	126·848	
Ir	Iridium	192·651	„ 0·033	193·094	Seubert's data.
Fe	Iron	55·913	„ 0·012	56·042	
La	Lanthanum ..	138·019	„ 0·025	138·336	
Pb	Lead	206·471	„ 0·021	206·946	
Li	Lithium	7·0073	„ 0·007	7·0235	
Mg	Magnesium ..	23·959	„ 0·005	24·014	Marchand and Scheerer's data.
Mu	Manganese.. ..	54·855	„ 0·016	54·981	
Hg	Mercury	199·712	„ 0·042	200·171	
Mo	Molybdenum ..	95·527	„ 0·051	95·747	
Ni	Nickel..	57·928	„ 0·022	58·062	Schneider, Sommaruga and Lee.
N	Nitrogen	14·021	„ 0·0035	14·029	
Os	Osmium	198·494	„ ..	198·951	Very doubtful.
O	Oxygen	15·9633	„ 0·0035	16·000	
Pd	Palladium	105·737	„ ..	105·981	Badly determined.
P	Phosphorus ..	30·958	„ 0·007	31·029	
Pt	Platinum	194·415	„ 0·049	194·867	Seubert's data.
K	Potassium	39·019	„ 0·012	39·109	
Rh	Rhodium	104·055	„ ..	104·285	Badly determined.

A TABLE OF THE ATOMIC WEIGHTS, &c.—*continued.*

Symbol.	Name.	H = 1.		O = 16.	Remarks.
Rb	Rubidium	85·251	± 0·018	85·529	
Ru	Ruthenium ..	104·217	,, ..	104·457	
Sa	Samarium	149·810	,, ..	150·145	
Sc	Scandium	43·980	,, 0·015	44·081	
Se	Selenium	78·797	,, 0·011	78·978	
Si	Silicon..	28·195	,, 0·066	28·260	Very badly determined.
Ag	Silver	107·675	,, 0·0096	107·923	
Na	Sodium	22·998	,, 0·011	23·051	
Sr	Strontium	87·374	,, 0·032	87·575	
S	Sulphur	31·984	,, 0·012	32·058	
Ta	Tantalum	182·144	,, 0·166	182·562	
Te	Tellurium	127·960	,, 0·034	128·254	Imperfectly determined.
Tl	Thallium	203·715	,, 0·0365	204·183	Crooks's data.
Th	Thorium	232·020	,, 0·032	232·554	
Sn	Tin	117·698	,, 0·040	117·968	
Ti	Titanium	47·980	,, 0·032	48·100	
W	Tungsten	183·610	,, 0·032	184·032	
Ur	Uranium	238·482	,, 0·082	239·030	
V	Vanadium	51·256	,, 0·024	51·373	
Yb	Ytterbium	172·761	,, 0·038	173·158	If $SO_3 = 80$ Yb = 173·016.
Yt	Yttrium	88·900	,, 0·027	89·104	
Zn	Zinc	64·9045	,, 0·019	65·054	Axel Erdmann's data.
Zr	Zirconium	89·367	,, 0·037	89·375	Doubtful.

FORMULÆ, MOLECULAR WEIGHTS, AND PERCENTAGE COMPOSITION OF IMPORTANT COMPOUNDS.

Name.	Formula.	Mol. Wt.	Percentage Composition.
Aluminium oxide ..	Al_2O_3	102·8	Al 53·30; O 46·70
,, hydrate ..	$Al_2H_6O_6$	156·8	Al 34·95; H 3·82; O 61·22
,, bromide ..	Al_2Br_6	534·8	Al 10·28; Br 89·72
,, chloride ..	Al_2Cl_6	267·8	Al 20·50; Cl 79·50
,, fluoride ..	Al_2F_6	337·6	Al 32·46; F 67·54
,, iodide ..	Al_2I_6	816·8	Al 6·73; I 93·27
,, sulphate crys.	$Al_2(SO_4)_3$,18Aq	666·8	Al_2O_3 15·40; SO_3 36·00; H_2O 48·60
Alum (potash)	$Al_2(SO_4)_3K_2SO_4$ +24Aq	949	$Al_2O_3$10·84; SO_3 33·73; H_2O45·52; K_2O 9·91
,, (ammonia).. ..	$Al_2(SO_4)_3Am_2$ SO_4+24Aq	907	Al_2O_3 11·35; NH_3 3·75; $SO_3$35·29; H_2O 49·61
Ammonia	NH_3	17	N 82·35; H 17·65
Ammonium carbonate .	$H_{13}N_3C_2O_5$	157	NH_3 32·49; CO_2 56·05; H_2O 11·46
,, chloride ..	NH_4Cl	53·5	NH_3 31·77; HCl 68·23
,, nitrate ..	NH_4NO_3	80	NH_3 21·25; N_2O_5 67·50; H_2O 11·25
,, sodium phosphate	$AmNaHPO_4$ +4Aq	209	NH_3 8·13; Na_2O 14·83; P_2O_5 33·97; H_2O 43·06
,, sulphate ..	Am_2SO_4	132	NH_3 25·76; SO_3 60·61; H_2O 13·63
,, sulphocyanate.	AmCyS	76	NH_3 22·37; H 1·31; CN 34·21; S 42·11

FORMULÆ, MOLECULAR WEIGHTS, &c.—*continued.*

Name.	Formula.	Mol. Wt.	Percentage Composition.
Antimonious oxide ..	Sb_2O_3	292	Sb 83·56 ; O 16·44
Antimonic oxide	Sb_2O_5	324	Sb 75·00 ; O 25·00
Antimonious bromide..	$SbBr_3$	362	Sb 33·70 ; Br 66·30
„ chloride..	$SbCl_3$	228·5	Sb 53·39 ; Cl 46·61
Antimonic chloride ..	$SbCl_5$	299·5	Sb 40·73 ; Cl 59·27
Antimonious iodide ..	SbI_3	503	Sb 24·26 ; I 75·74
„ sulphide .	Sb_2S_3	340	Sb 71·80 ; S 28·20
Antimonic sulphide ..	Sb_2S_5	404	Sb 60·39 ; S 39·61
Arsenious oxide	As_2O_3	198	As 75·75 ; O 24·25
Arsenic oxide	As_2O_5	230	As 65·30 ; O 34·70
Arsenious chloride ..	$AsCl_3$	181·5	As 41·40 ; Cl 58·60
„ sulphide ..	As_2S_3	246	As 60·98 ; S 39·02
Arsenic sulphide	As_2S_5	310	As 48·39 ; S 51·61
Barium oxide..	BaO	153	Ba 89·54 ; O 10·46
„ hydrate	BaH_2O_2	171	BaO 89·47 ; H_2O 10·53
„ carbonate.. ..	$BaCO_3$	197	BaO 77·60 ; CO_2 22·40
„ sulphate	$BaSO_4$	233	BaO 65·66 ; SO_3 34·33
Boric anhydride	B_2O_3	70	B 31·43 ; O 68·57
„ acid	H_3BO_3	62	B_2O_3 56·45 ; H_2O 43·55
Cadmium oxide	CdO	128	Cd 87·50 ; O 12·50
„ carbonate ..	$CdCO_3$	172	CdO 74·42 ; CO_2 25·58
„ chloride ..	$CdCl_2$	183	Cd 61·20 ; Cl 38·80
„ sulphate ..	$CdSO_4,4Aq$	280	CdO 45·72 ; SO_3 28·57 ; H_2O 25·71

FORMULÆ, MOLECULAR WEIGHTS, &c.—*continued.*

Name.	Formula.	Mol. Wt.	Percentage Composition.
Calcium oxide	CaO	56	Ca 71·43; O 28·57
„ hydrate	CaH_2O_2	74	CaO 75·67; H_2O 24·33
„ carbonate ..	$CaCO_3$	100	CaO 56·00; CO_2 44·00
„ phosphate ..	$Ca_3P_2O_8$	310	CaO 54·19; P_2O_5 45·81
„ sulphate	$CaSO_4$	136	CaO 41·18; SO_3 58·82
„ chloride	$CaCl_2$	111	Ca 36·05; Cl 63·95
„ fluoride	CaF_2	78	Ca 51·28; F 48·72
„ sulphide	CaS	72	Ca 55·56; O 44·44
„ sulphide (per)	CaS_5	200	Ca 20·00; S 80·00
„ thiosulphate ..	CaS_2O_3	152	CaO 36·84; SO_2 42·11; S 21·05
Carbonic oxide	CO	28	C 42·85; O 57·15
„ anhydride ..	CO_2	44	C 27·27; O 72·73
Chromium oxide	Cr_2O_3	152·2	Cr 68·60; O 31·40
Cobalt oxide	CoO	74·8	Co 78·61; O 21·39
Copper suboxide	Cu_2O	143	Cu 88·80; O 11·20
„ oxide..	CuO	79·5	Cu 79·87· O 20·13
„ sulphate	$CuSO_4,5Aq$	249·5	CuO 31·86; SO_3 32·06; H_2O 36·08
„ subsulphide ..	Cu_2S	159·5	Cu 79·87; S 20·13
„ sulphide	CuS	95·5	Cu 66·50; S 33·50
Hydrochloric acid.. ..	HCl	36·5	Cl 97·26; H 2·74
Iron oxide	Fe_2O_3	160	Fe 70·00; O 30·00
„ hydrate (ferric) ..	$Fe_2H_6O_6$	214	Fe_2O_3 74·80; H_2O 25·20
„ chloride (ferrous)	$FeCl_2$	127	Fe 44·09; Cl 55·91

FORMULÆ, MOLECULAR WEIGHTS, &c.—*continued.*

Name.	Formula.	Mol. Wt.	Percentage Composition.
Iron chloride (ferric) ..	Fe_2Cl_6	325	Fe 34·46; Cl 65·54
,, sulphide	FeS	88	Fe 63·64; S 36·36
,, pyrites	FeS_2	120	Fe 46·67; S 53·33
,, sulphate (ferrous)	$FeSO_4,7Aq$	278	Fe 20·14; O 5·76; SO_3 28·78; H_2O 45·32
Lead oxide	PbO	223	Pb 92·80; O 7·20
,, carbonate	$PbCO_3$	267	PbO 83·50; CO_2 16·50
,, chloride	$PbCl_2$	278	Pb 74·50; Cl 25·50
,, sulphate	$PbSO_4$	303	PbO 73·50; SO_3 26·50
,, sulphide	PbS	239	Pb 86·60; S 13·40
Magnesium oxide.. ..	MgO	40	Mg 60·00; O 40·00
,, hydrate ..	MgH_2O_2	58	MgO 68·30; H_2O 31·70
,, carbonate..	$MgCO_3$	84	MgO 47·62; CO_2 52·38
,, sulphate ..	$MgSO_4,7Aq$	246	MgO 16·26; SO_3 32·52; H_2O 51·22
,, pyrophos-phate.	$Mg_2P_2O_7$	222	MgO 36·04; P_2O_5 63·96
Manganous oxide.. ..	MnO	71	Mn 77·47; O 22·53
Trimanganic tetroxide	Mn_3O_4	229	Mn 72·05; O 27·95
Manganic oxide	Mn_2O_3	158	Mn 69·62; O 30·38
,, dioxide ..	MnO_2	87	Mn 63·22; O 36·78
Manganese chloride ..	$MnCl_2$	126	Mn 43·65; Cl 56·35
,, sulphate ..	$MnSO_4$	151	MnO 47·02; SO_3 52·98
Mercury oxide	HgO	216	Hg 92·60; O 7·40

FORMULÆ, MOLECULAR WEIGHTS, &c.—*continued.*

Name.	Formula.	Mol. Wt.	Percentage Composition.
Mercury subchloride ..	Hg_2Cl_2	471	Hg 85·00; Cl 15·00
„ chloride	$HgCl_2$	271	Hg 73·80; Cl 26·20
„ sulphide.. ..	HgS	232	Hg 86·20; S 13·80
Molybdic anhydride ..	MoO_3	143·5	Mo 66·55; O 33·45
„ sulphide ..	MoS_3	191·5	Mo 49·86; S 50·13
Nickel oxide	NiO	74·8	Ni 78·60; O 21·40
„ sulphate	$NiSO_4,7Aq$	280·8	Ni 26·63; SO_3 28·50; H_2O 44·87
Nitrous oxide	N_2O	44	N 63·64; O 36·36
Nitric oxide	NO	30	N 46·67; O 53·33
„ peroxide	NO_2	46	N 30·44; O 69·56
„ acid	HNO_3	63	N_2O_5 85·70; H_2O 14·30
Platinum chloride ..	$PtCl_4$	339·18	Pt 58·13; Cl 41·86
Potassium oxide	K_2O	94	K 82·98; O 17·02
„ hydrate ..	KHO	56	K_2O 83·93; H_2O 16·07
„ carbonate ..	K_2CO_3	138	K_2O 68·12; CO_2 31·88
„ bicarbonate	$KHCO_3$	100	K_2O 47·00; CO_2 44; H_2O 9·00
„ chlorate ..	$KClO_3$	122·5	K_2O 38·37; Cl 28·98; O 32·65
„ chloride ..	KCl	74·5	K 52·35; Cl 47·65
„ ferricyanide	$K_6Fe_2(CN)_{12}$	658	K 35·56; Fe 17·02; CN 47·42
„ ferrocyanide	$K_4Fe(CN)_6,3Aq$	422	K 37·03; Fe 13·25; CN 36·93; H_2O 12·79
„ iodide	KI	166	K 23·49; I 76·51
„ nitrate ..	KNO_3	101	K_2O 46·54; N_2O_5 53·46

FORMULÆ, MOLECULAR WEIGHTS, &c.—*continued.*

Name.	Formula.	Mol. Wt.	Percentage Composition.
Potassium permanganate	$KMnO_4$	158	K_2O 29·75; Mn_2O_7 70·25
" platinum chloride.	K_2PtCl_6	488·18	Pt 40·39; Cl 43·63; K 15·98
" sulphate ..	K_2SO_4	174	K_2O 54·02; SO_3 45·98
" sulphocyanate	KCNS	97	K 40·21; C 12·37; N 14·43; S 32·99
Selenium dioxide	SeO_2	111	Se 71·17; O 28·83
Silica	SiO_2	60	Si 46·67; O 53·33
Silver oxide	Ag_2O	232	Ag 93·10; O 6·90
" carbonate	Ag_2CO_3	276	Ag_2O 84·00; CO_2 16·00
" nitrate	$AgNO_3$	170	Ag_2O 68·00; N_2O_5 32·00
" chloride	AgCl	143·5	Ag 75·27; Cl 24·73
" bromide	AgBr	188	Ag 57·50; Br 42·50
" iodide	AgI	235	Ag 46·00; I 54·00
Sodium oxide	Na_2O	62	Na 74·20; O 25·80
" hydrate	NaHO	40	Na_2O 77·50; H_2O 22·50
" chloride	NaCl	58·5	Na 39·35; Cl 60·65
" bromide	NaBr	103	Na 22·30; Br 77·70
" iodide	NaI	150	Na 15·33; I 84·67
" borate	$Na_2B_4O_7,10Aq$	382	Na_2O 16·30; B_2O_3 36·60; H_2O 47·10
" carbonate.. ..	Na_2CO_3	106	Na_2O 58·50; CO_2 41·50
" carbonate.. ..	$Na_2CO_3,10Aq$	286	Na_2O 21·80; CO_2 15·40; H_2O 62·80

FORMULÆ, MOLECULAR WEIGHTS, &c.—*continued.*

Name.	Formula.	Mol. Wt.	Percentage Composition.
Sodium bicarbonate ..	$NaHCO_3$	84	Na_2O 36·90; CO_2 52·37; H_2O 10·73
„ chlorate	$NaClO_3$	106·5	Na_2O 29·10; Cl_2O_5 70·90
„ nitrate	$NaNO_3$	85	Na_2O 36·47; N_2O_5 63·53
„ phosphate ..	$Na_2HPO_4,12Aq$	358	Na_2O 17·32; P_2O_5 19·84; H_2O 62·84
„ sulphate	Na_2SO_4	142	Na_2O 43·66; SO_3 56·34
„ sulphate	$Na_2SO_4,10Aq$	161	Na_2O 19·25; SO_3 24·84; H_2O 55·91
„ sulphite	$Na_2SO_3,6Aq$	234	Na_2O 26·50; SO_2 27·35; H_2O 46·15
„ thiosulphate ..	$Na_2S_2O_3,5Aq$	248	Na_2O 25·00; S 12·90; SO_2 25·80; H_2O 36·30
Sulphur dioxide	SO_2	64	S 50·00; O 50·00
„ trioxide	SO_3	80	S 40·00; O 60·00
Sulphuric acid	H_2SO_4	98	SO_3 81·63; H_2O 18·37
Pyrosulphuric acid ..	$H_2S_2O_7$	178	H_2SO_4 55·06; SO_3 44·94
Sulphuretted hydrogen	H_2S	34	S 94·12; H 5·88
Tin chloride	$SnCl_2,2Aq$	225	Sn 52·44; Cl 31·56; H_2O 16·00
„ oxide	SnO_2	150	Sn 78·66; O 21·34
Water	H_2O	18	H 11·11; O 88·89
Zinc oxide	ZnO	81	Zn 80·25; O 19·75
„ chloride	$ZnCl_2$	136	Zn 47·79; Cl 52·21
„ sulphate	$ZnSO_4,7Aq$	287	ZnO 28·22; SO_2 27·87; H_2O 43·91
„ sulphide	ZnS	97	Zn 67·01; S 32·99

Table showing the Equivalence of Weights and Measures.

Contributed by Mr. G. M. Jones.

lb. avoirdupois = 1 lb. = 16 oz. = 7000 grains = 453·59 grammes
= 1·21527 ℔. troy

1 ℔. apoth. or troy = 1 ℔. = 12 ℥ = 5760 grains = 373·242 grammes
= 0·82285714 lb. avoir.

1 oz. avoir. = 1 oz. = 437·5 grains = 28·35 grammes
= 0·9114583 ℥

1 ounce apoth. or troy = 1 ℥ = 480 grains = 31·10 grammes
= 1·0973714 oz.

1 dram avoir. = 27·34375 grains = 1·77184 grammes
= drachm apoth. ·455729

1 drachm apoth. or troy = 1 ʒ = 3 ℈ (scruples) = 60 grains
= drams avoir. 2·1942857
= 3·88752 grammes

1 pint = O = 20 ℥ fl. = The volume occupied by 20 oz. avoir. of water at 60° F. = 15·5° C.

1 fluid oz. = ℥ fl. i = The volume occupied by 1 oz. avoir. of water at 60° F. = $\frac{1}{20}$th pint

1 fluid drachm = ʒ fl. i = 60 minims = 54·6875 grain measures
= 3·549 c.c.

1 minim = ·9114583 grain measure = ·0591583 c.c.

1 grain measure = 1·09714285 minim = the vol. occupied by 1 gr. of water at 60° F. = 15·5 C.

1 cub. cent. = 1 c.c. = ʒ fl. ·282
1 „ „ „ = cub. inch ·0610270734
1 „ „ „ = ℥ fl. ·0352
1 „ „ „ = pint ·00176

1 cub. foot = c.c. 28315·3
1 „ „ = gallons 6·2321
1 „ „ = litres 28·3153
1 „ „ = oz. fl. 997·1364
= pints 49·8568

EQUIVALENCE OF WEIGHTS AND MEASURES—*continued.*

gallon	= cub. ft. ·16046
1 „	= cub. inch. 277·274
1 „	= litre 4 54346
1 cub. inch	= c.c. 16·386
1 „ „	= ʒ fl. 4·616
1 „ „	= gallon ·00360654
1 „ „	= litre ·0164
1 „ „	= ℥ fl. ·577
1 „ „	= pint ·02885
1 litre	= ʒ fl. 281·85
1 „	= cub. ft. ·035316
1 „	= gallon ·220096
1 „	= cub. inch. 61·0270
1 „	= ℥ fl. 35·23
1 „	= pint 1·761
1 oz. fl.	= c.c. 28·396
1 „	= cub. inch. 1·7329
1 pint	= c.c. 567·919
1 „	= cub. ft. ·020057
1 „	= cub. inch. 34·659
1 „	= litre ·567920
1 gramme	= lb. ·002204
1 „	= oz. ·03527
1 „	= ℔ ·002679
1 „	= ℥ ·03215
1 „	= dram ·564357
1 „	= ʒ ·2572
1 „	= grains 15·432348
1 grain avoir.	= 1 grain apoth. or troy
1 „	= gramme ·064792
1 „	= lb. ·000142857
1 „	= ℔ ·0001738i

EQUIVALENCE OF WEIGHTS AND MEASURES—*continued.*

1 mile per unit of time	= 1·609315 kilometres per same unit
1 „ „ hour	= ·44703 metre per second
1 „ „ „	= 26·8219 metres per minute
1 gramme per sq. cent.	= ·2275632 oz. avoir. per sq. inch
1 „ „ „	= 32·7691 oz. av. per sq. ft.
1 „ „ „	= 0·0142227 lb. av. per sq. inch
1 kilo. per sq. decimetre	= 2·2756 oz. av. per sq. inch
1 gramme per sq. cent.	= 2·0480688 lb. av. per sq. ft.
1 cwt. per sq inch	= 7874·675 grammes per sq. cent.
1 „ „ foot	= 5468·52432 grammes per sq. decim.
1 lb. av. per sq. inch	= 70·3096 grammes per sq. cent.
1 „ „ foot	= 48·82611 grammes per sq. cent.
1 calorie	= 1 kilo. of water raised 1° C.
1 centigrade thermal unit	= 1 lb. av. raised 1° C.
1 Fahr. therm. unit	= 1 lb. av. raised 1° F.
1 kilogrammetre	= 1 kilogramme raised 1 metre
1 foot-pound	= 1 lb. av. raised 1 foot
1 calorie	= cent. therm. units 2·20462
1 „	= Fahr. „ „ 3·96832
1 „	= foot-pounds 3066·85127
1 „	= kilogrammetres 424·00000
1 cent. th. unit	= calorie ·45359
1 „ „	= Fahr. th. unit 1·80000
1 „ „	= kilogrammetres 192·32329
1 „ „	= ft. pounds 1391·10127
1 Fahr. th. unit	= calorie ·25199
1 „ „	= cent. th. unit ·$\dot{5}$55...
1 „ „	= kilogrammetres 106·84627
1 „ „	= ft. pounds 772·83404
1 kilogrammetre	= calorie ·0023585
1 „	= cent. th. unit ·0051996
1 „	= Fahr. th. unit ·0093592
1 „	= ft. pounds 7·2331398

EQUIVALENCE OF WEIGHTS AND MEASURES—*continued.*

1 foot-pound	= calorie ·000326067
1 „	= cent. th. unit ·000718855
1 „	= Fahr. th. unit ·001293845
1 „	= kilogrammetre ·138252542
1 horse-power	= cheval-vapeur 1·01346̇..
1 „	= ft. pd. per sec. 550
1 „	= „ min. 33000
1 „	= kilogrammet. per sec. 76·01
1 „	= „ „ min. 4560·6
1 cheval-vapeur	= horse-power ·986712
1 „	= ft. pd. per sec. 542·485
1 „	= „ min. 32549·1291
1 „	= kilogrammet. per sec. 75·0000..
1 „	= „ „ min. 4500·0...
1 kilogrmtr. per sec.	= cheval-vapeur ·013̇...
1 „ „ „	= horse-power ·0135126
1 „ „ min.	= cheval-vapeur ·0002̇...
1 „ „ „	= horse-power ·0002252

TABLE FOR CORRECTION OF VOLUMES OF GASES FOR TEMPERATURE.

I. The volume at 0° C. being known, to find the corresponding volume at any temperature between 0° and 30° C., multiply the number of c.c. by the factor in the first column, and add the result to the original volume.

Temp.	Correction for 1° C.	Multiples of Correction.							
		2	3	4	5	6	7	8	9
1	·00369	·00738	·01107	·01476	·01845	·02214	·02583	·02952	·03321
2	·00742	·01484	·02226	·02968	·03710	·04452	·05194	·05936	·06678
3	·0109	·0218	·0327	·0436	·0545	·0654	·0763	·0872	·0981
4	·0146	·0292	·0438	·0584	·0730	·0876	·1022	·1168	·1314
5	·0183	·0366	·0549	·0732	·0915	·1098	·1281	·1464	·1647
6	·0219	·0438	·0657	·0876	·1095	·1314	·1533	·1752	·1971
7	·0256	·0512	·0768	·1024	·1280	·1536	·1792	·2048	·2304
8	·0293	·0586	·0879	·1172	·1465	·1758	·2051	·2344	·2637
9	·0330	·0660	·0990	·1320	·1650	·1980	·2310	·2640	·2970
10	·0366	·0732	·1098	·1464	·1830	·2196	·2562	·2928	·3294
11	·0403	·0806	·1209	·1612	·2015	·2418	·2821	·3224	·3627
12	·0440	·0880	·1320	·1760	·2200	·2640	·3080	·3520	·3960
13	·0475	·0950	·1425	·1900	·2375	·2850	·3325	·3800	·4275
14	·0511	·1022	·1533	·2044	·2555	·3066	·3577	·4088	·4599
15	·0548	·1096	·1644	·2192	·2740	·3288	·3836	·4384	·4932
16	·0585	·1170	·1755	·2340	·2925	·3510	·4095	·4680	·5265
17	·0622	·1244	·1866	·2488	·3110	·3732	·4354	·4976	·5598
18	·0660	·1320	·1980	·2640	·3300	·3960	·4620	·5280	·5940
19	·0696	·1392	·2088	·2784	·3480	·4176	·4872	·5568	·6264
20	·0732	·1464	·2196	·2928	·3660	·4392	·5124	·5856	·6588
21	·0770	·1540	·2310	·3080	·3850	·4620	·5390	·6160	·6930
22	·0804	·1608	·2412	·3216	·4020	·4824	·5628	·6432	·7236
23	·0842	·1684	·2526	·3368	·4210	·5052	·5894	·6736	·7578
24	·0876	·1752	·2628	·3504	·4380	·5256	·6132	·7008	·7884
25	·0914	·1828	·2742	·3656	·4570	·5484	·6398	·7312	·8226
26	·0952	·1904	·2856	·3808	·4760	·5712	·6664	·7616	·8568
27	·0988	·1976	·2964	·3952	·4940	·5928	·6916	·7904	·8892
28	·1025	·2050	·3075	·4100	·5125	·6150	·7175	·8200	·9225
29	·1063	·2126	·3189	·4252	·5315	·6378	·7441	·8504	·9567
30	·1100	·2200	·3300	·4400	·5500	·6600	·7700	·8800	·9900

Table for Correction of Volumes of Gases for Temperature.

I. The volume at any temperature between 0° and 30° C. being known, to find the corresponding volume at 0° C., multiply the number of c.c. by the factor in the first column and subtract the result from the original volume.

Temp.	Correction for 1 c.c.	Multiples of Correction.							
		2	3	4	5	6	7	8	9
1	·0037	·0074	·0111	·0148	·0185	·0222	·0259	·0296	·0333
2	·0073	·0146	·0219	·0292	·0365	·0438	·0511	·0584	·0657
3	·0109	·0218	·0327	·0436	·0545	·0654	·0763	·0872	·0981
4	·0144	·0288	·0432	·0576	·0720	·0864	·1008	·1152	·1296
5	·0180	·0360	·0540	·0720	·0900	·1080	·1260	·1440	·1620
6	·0215	·0430	·0645	·0860	·1075	·1290	·1505	·1720	·1935
7	·0250	·0500	·0750	·1000	·1250	·1500	·1750	·2000	·2250
8	·0284	·0568	·0852	·1136	·1420	·1704	·1988	·2272	·2556
9	·0319	·0638	·0957	·1276	·1595	·1914	·2233	·2552	·2871
10	·0353	·0706	·1059	·1412	·1765	·2118	·2471	·2824	·3177
11	·0387	·0774	·1161	·1548	·1935	·2322	·2709	·3096	·3483
12	·0421	·0842	·1263	·1684	·2105	·2526	·2947	·3368	·3789
13	·0454	·0908	·1362	·1816	·2270	·2724	·3178	·3632	·4086
14	·0487	·0974	·1461	·1948	·2435	·2922	·3409	·3896	·4383
15	·0520	·1040	·1560	·2080	·2600	·3120	·3640	4160	·4680
16	·0553	·1106	·1659	·2212	·2765	·3318	·3871	·4424	·4977
17	·0586	·1172	·1758	·2344	·2930	·3516	·4102	·4688	·5274
18	·0618	·1236	·1854	·2472	·3090	·3708	·4326	·4944	·5562
19	·0651	·1302	·1953	·2604	·3255	·3906	·4557	·5208	·5859
20	·0682	·1364	·2046	·2728	·3410	·4092	·4774	·5456	·6138
21	·0714	·1428	·2142	·2856	·3570	·4284	·4998	·5712	·6426
22	·0745	·1490	·2235	·2980	·3725	·4470	·5215	·5960	·6705
23	·0776	·1552	·2328	·3104	·3880	·4656	·5432	·6208	·6984
24	·0807	·1614	·2421	·3228	·4035	·4842	·5649	·6456	·7263
25	·0838	·1676	·2514	·3352	·4190	·5028	·5866	·6704	·7542
26	·0869	·1738	·2607	·3476	·4345	·5214	·6083	·6952	·7821
27	·0899	·1798	·2697	·3596	·4495	·5394	·6293	·7192	·8091
28	·0930	·1860	·2790	·3720	·4650	·5580	·6510	·7440	·8370
29	·0960	·1920	·2880	·3840	·4800	·5760	·6720	·7680	·8640
30	·0991	·1982	·2973	·3964	·4955	·5946	·6937	·7928	·8919

Table for Correction of Volumes of Gases to Normal Barometer Pressure of 760 m.m.

Multiply the observed number of c.c. by the factor opposite the observed pressure and add or subtract the result.

Pressure in m.m.	Factor.	Pressure in m.m.	Factor.	Pressure in m.m.	Factor.
710	·06579	730	·03947	750	·01316
711	·06447	731	·03816	751	·01184
712	·06316	732	·03684	752	·01053
713	·06184	733	·03553	753	·00921
714	·06052	734	·03421	754	·00784
715	·05921	735	·03289	755	·00658
716	·0 789	736	·03158	756	·00526
717	·05658	737	·03026	757	·00395
718	·05525	738	·02895	758	·00263
719	·05395	739	·02763	759	·00132
720	·05263	740	·02631	760	·00000
721	·05132	741	·02500	761	·00132
722	·05000	742	·02368	762	·00263
723	·04868	743	·02237	763	·00395
724	·04737	744	·02105	764	·00526
725	·04605	745	·01973	765	·00658
726	·04474	746	·01842	766	·00784
727	·04342	747	·01710	767	·00921
728	·04210	748	·01579	768	·01053
729	·04079	749	·01447	769	·01184

TABLE OF THE FUSING POINTS OF VARIOUS SUBSTANCES.

	° C.		° C.
Yellow bees'-wax	63·4	Hg	−39
White "	61·8	P	44
	49·6	Pb	332
	52·5–54	S	115
Paraffin	53	I	107
	52·7–53·2	Bi	270
Spermaceti	43·5	Cd	320
	44·1	Sn	235
	55·3	Ag	1000
Stearic acid	56·2	Zn	433
	56	$CaCl_2, 3H_2O$	28·5
Japan wax	50·4–51	KNO_3	353
Cacao butter	33·5	$NaNO_3$	310·5
Nutmeg butter	70–80	$KClO_3$	372
Mutton suet	46·5–47·4	KCl	434
Beef suet	43·5–45	KI	639
Ceresin	71·35	KBr	703
Stearin	51·45	K_2CO_3	838
Succinic acid	180	AsI_3	146
Adipic "	148	H_3BO_3	186
Suberic "	140	$AgNO_3$	217
Sebic "	127	$\underbrace{COHO.COHO}$	203
Pyrotartaric "	97	$HgBr_2$	242
α Pimetic "	102	$LiNO_3$	267
α Zelaic "	108	Tl_2CO_3	273
Acetic "	17	$HgCl_2$	293
Butyric "	0	SbF_3	292
Caproic "	−2	$NaClO_3$	302
Caprylic "	16	PbI_2	383
Capric "	30	$ZnBr_2$	394
Palmitic "	62	CdI_2	404
Stearic "	69·2	$Ba(ClO_3)_2$	414
Œnanthylic "	−10·5	AgBr	427
		TlCl	427
Pelargonic "	12	Ag_3VO_4	403–565
Margaric "	59·9	Cu_2Cl_2	434

FUSING POINTS OF VARIOUS SUBSTANCES—*continued.*

	° C.		° C.
TlI	439	KI	634
LiI	446	RbI	642
ZnI_2	446	$Sr(NO_3)_2$	645
AgCl	451	$Na_4V_2O_7$	654
TlBr	458	Ag_2SO_4	654
$AgPO_3$	482	V_2O_5	658
$CuCl_2$	498	$CaBr_2$	676
$PbCl_2$	498	RbBr	683
$PbBr_2$	499	Li_2CO_3	695
SrI_2	507	$MgBr_2$	695
CdF_2	520	KBr	699
AgI	527	NaBr	708
$CdCl_2$	541	$MgCl_2$	708
LiBr	547	RbCl	710
$Cu(NO_3)_2$	561	$CaCl_2$	719
$Na_2B_4O_7$	561	KCl	734
$NaVO_3$	562	ZnF_2	734
$Na_{12}V_8O_{26}$	562	RbF	753
Tl_3VO_4	566	MoO_3	759
$CdBr_2$	571	NaCl	772
$Ba(NO_3)_2$	593	KF	789
B_2O_3	577	$Pb(PO_3)_2$	800
$Ag_4P_2O_7$	585	LiF	801
LiCl	598	$Pb_2P_2O_7$	806
Cu_2I_2	601	$BaBr_2$	812
$NaPO_3$	617	Na_2CO_3	814
NaI	628	Li_2SO_4	818
$SrBr_2$	630	$SrCl_2$	825
CaI_2	631	K_2CO_3	834
Tl_2SO_4	632	Na_2SO_4	861

NOTE.—This table may be used to ascertain the temperature of furnaces, etc. A selection of salts is made and the temperature found by observing the behaviour of the salts in the furnace.

TABLE SHOWING THE BEHAVIOUR OF VARIOUS ORGANIC SUBSTANCES WITH SOLVENTS.

From Allen's 'Commercial Organic Analysis.'

Name of Substance.	Formula.	Solubility in 100 Parts of										Remarks. (The sign ∞ signifies that the substance and solvent are miscible in all proportions).
		Cold Water.	Boiling Water.	10 per cent. NaHO Solution.	Rectified Spirit.	Amylic Alcohol.	Ether.	Chloroform.	Carbon Disulphide.	Benzene.	Petroleum Ether.	
Ethyl alcohol	C_2H_6O	∞	∞	∞	∞	∞	∞	∞	S	∞	∞	Any contained water is separated by excess of 5 last solvents.
Amyl alcohol	$C_5H_{12}O$	2½	..	2½	∞	∞	∞	∞	∞	∞	∞	Soluble in acetic acid mixed with equal volume of water.
Glycerin.. ..	$C_3H_8O_3$	∞	∞	∞	∞	..	I	I	I	I	I	
Nitroglycerin	$C_3H_5N_3O_9$	I	I	I	S	..	S	..	..	..	..	Decomposed by boiling soda solution. Soluble in wood spirit.
Ether	$C_4H_{10}O$	10	..	10	∞	∞	∞	∞	∞	∞	∞	
Chloral hydrate.	$C_2HCl_3O_1H_2O$	67	S	(S)	S	..	S	S	S	S	S	Decomposed by soda with separation of chloroform.

TABLE SHOWING THE BEHAVIOUR OF VARIOUS ORGANIC SUBSTANCES WITH SOLVENTS—*continued.*

Name of Substance.	Formula.	Solubility in 100 Parts of										Remarks. (The sign ∞ signifies that the substance and solvent are miscible in all proportions).
		Cold Water.	Boiling Water.	10 per cent. NaHo Solution.	Rectified Spirit.	Amylic Alcohol.	Ether.	Chloroform.	Carbon Disulphide.	Benzene.	Petroleum Ether.	
Chloroform ..	$CHCl_3$	I	I	I	S	∞	∞	∞	∞	∞	∞	
Iodoform ..	CHI_3	I	I	I	1¼	..	S	S	S	(S)	(S)	Dissolved by 13,000 parts of cold water.
Acetic acid ..	$C_2H_4O_2$	∞	∞	∞	∞	∞	(S)	..	..	..	..	Soluble in ether only when anhydrous.
Oxalic acid (crystallised).	$C_2H_2O_4, 2\,H_2O$	8	350	S	15	..	(I)	I	..	I	I	Soluble in ether to extent of 1¼ per cent.
Lactic acid ..	$C_3H_6O_3$	∞	∞	S	∞	S	∞	(S)	..	..	..	
Succinic acid ..	$C_4H_6O_4$	8	60	S	12½	..	15	I	..	I	..	Soluble in 13 parts absolute alcohol. Decomposed on boiling.
Tartaric acid..	$C_4H_6O_6$	25	100	S	41	..	(I)	I	..	I	I	Soluble in ether to extent of 4 per cent. Decomposed by fusion.
Citric acid ..	$C_6H_8O_7, H_2O$	133	200	S	53	..	2¼	I	..	I	I	Absolute alcohol dissolves 39 per cent.

TABLE SHOWING THE BEHAVIOUR OF VARIOUS ORGANIC SUBSTANCES WITH SOLVENTS—*continued.*

Name of Substance.	Formula.	Solubility in 100 Parts of										Remarks. (The sign ∞ signifies that the substance and solvent are miscible in all proportions).
		Cold Water.	Boiling Water.	10 per cent. NaHO Solution.	Rectified Spirit.	Amylic Alcohol.	Ether.	Chloroform.	Carbon Disulphide.	Benzene.	Petroleum Ether.	
Meconic acid..	$C_7H_4O_7, 3H_2O$	·9	S	S	12	..	I	..	..	..	..	Soluble in about 150 parts of ether.
Gallic acid ..	$C_7H_6O_5, H_2O$	I	33	S	23	..	2½	..	..	..	..	Decomposed by heat. Very soluble in absolute alcohol.
Pyrogallic acid	$C_6H_6O_3$	33	S	S	S	..	S	I	..	..	..	Solution in soda turns rapidly brown in air.
Gallotannic acid.	Indefinite	S	S	S	S	..	(I)	I	I	I	I	Soluble in acetic ether.
Sulphophenic acid.	$C_6H_6SO_4$	S	S	S	S	..	I	I	..	..	..	Decomposed on boiling.
Picric acid ..	$C_6H_3N_3O_7$	I	S	S	S	S	S	S	S	S	S	
Benzoic acid ..	$C_7H_6O_2$	½	8	S	42	..	31	S	S	S	S	
Salicylic acid..	$C_7H_6O_3$	(I)	S	S	42	..	50	..	..	S	..	Very slightly soluble in cold water.
Phthalic acid..	$C_8H_6O_4$	⅘	S	S	S	..	S	..	..	S	..	

TABLE SHOWING THE BEHAVIOUR OF VARIOUS ORGANIC SUBSTANCES WITH SOLVENTS—*continued.*

Name of Substance.	Formula.	Solubility in 100 Parts of										Remarks. (The sign ∞ signifies that the substance and solvent are miscible in all proportions).
		Cold Water.	Boiling Water.	10 per cent. NaHO Solution.	Rectified Spirit.	Amylic Alcohol.	Ether.	Chloroform.	Carbon Disulphide.	Benzene.	Petroleum Ether.	
Chrysophanic acid.	$C_{15}H_{10}O_4$	I	(I)	S	S	..	S	S	..	S	S	Alkaline solution is purple-red.
Hippuric acid	$C_9H_9NO_3$	¼	S	S	S	..	I	I	..	I	..	
Uric acid ..	$C_5H_4N_4O_3$	I	I	S	I	..	I	..	..	..	..	
Higher fatty acids.	Various	I	I	S	S	S	S	S	S	S	S	Aqueous and alkali solutions precipitated by excess of soda.
Fixed oils ..	Various	I	I	I	(I)	S	S	S	S	S	S	Castor oil is soluble in spirit and insoluble in petroleum ether.
Oil of turpentine	$C_{10}H_{16}$	I	I	I	∞	S	∞	∞	∞	∞	∞	
Camphor ..	$C_{10}H_{16}O$	I	I	I	S	..	S	S	S	..	..	
Paraffin wax ..	C_nH_{2n2+2}	I	I	I	(I)	..	S	S	S	S	S	Soluble in hot absolute alcohol, insoluble in cold.
Benzene	C_6H_6	I	I	I	∞	S	∞	∞	S	∞	∞	

TABLE SHOWING THE BEHAVIOUR OF VARIOUS ORGANIC SUBSTANCES WITH SOLVENTS—*continued.*

Name of Substance.	Formula.	Solubility in 100 Parts of: Cold Water.	Boiling Water.	10 per cent. NaHO Solution.	Rectified Spirit.	Amylic Alcohol.	Ether.	Chloroform.	Carbon Disulphide.	Benzene.	Petroleum Ether.	Remarks. (The sign ∞ signifies that the substance and solvent are miscible in all proportions).
Nitrobenzene..	$C_6H_5NO_2$	I	I	I	∞	..	∞	..	..	∞	..	
Naphthalene ..	$C_{10}H_8$	I	I	I	S	..	S	S	S	S	S	Sparingly soluble in cold spirit, ether, or benzene.
Anthracene ..	$C_{14}H_{10}$	I	I	I	(S)	..	S	S	S	S	(I)	
Alizarin	$C_{14}H_8O_4$	I	(I)	S	S	..	S	..	S	S	..	Slightly soluble in hot water.
Aurin	$C_{19}H_{14}O_3$	I	I	S	S	..	S	I	I	I	S	Slightly soluble in water. Alkaline solutions red.
Indigotin ..	$C_{16}H_{10}N_2O_4$	I	I	I	I	S	I	S	S	I	..	Soluble in hot aniline, phenol, and creasote, and in strong sulphuric acid.
Carbolic acid (absolute).	C_6H_6O	$8\frac{1}{2}$	S	S	∞	..	∞	∞	∞	∞	S	Sparingly soluble in cold petroleum spirit.
Resorcinol ..	$C_6H_6O_2$	S	S	S	S	..	S	I	I	(S)	..	Soluble in hot benzene; deposited on cooling.

TABLE SHOWING THE BEHAVIOUR OF VARIOUS ORGANIC SUBSTANCES WITH SOLVENTS—*continued.*

Name of Substance.	Formula.	Solubility in 100 Parts of										Remarks. (The sign ∞ signifies that the substance and solvent are miscible in all proportions).
		Cold Water.	Boiling Water.	10 per cent. NaHO Solution.	Rectified Spirit.	Amylic Alcohol.	Ether.	Chloroform.	Carbon Disulphide.	Benzene.	Petroleum Ether.	
Orcinol	$C_7H_6O_2+H_2O$	S	(S)	..	S	..	S	..	..	S	..	Soluble with difficulty in hot water and in alkaline solutions.
Thymol	$C_{10}H_{14}O$	(I)	..	S	100	..	S	..	..	..	..	Insoluble in small quantities of soda. Soluble in 1000 of water.
Menthol	$C_{10}H_{20}O$	I	I	I	S	..	S	..	..	S	..	
Creasote (mixture).	$C_8H_{10}O_2$; &c.	..	I	(S)	S	..	∞	∞	∞	∞	∞	Soluble with difficulty in soda. Insoluble in ammonia.

Table showing the Behaviour of Organic Substances with Immiscible Solvents.

From Allen's 'Commercial Organic Analysis.'

On agitating the substance with water, acidulated with sulphuric acid, and a suitable solvent immiscible therewith (such as ether, chloroform, amylic alcohol, benzene, or petroleum ether), the following distribution will occur:—

The Acidulated Aqueous Liquid will contain *carbohydrates, soluble alkaloids and acids, organic bases, proteids,* &c., which may be further separated by adding a moderate excess of soda, and again shaking with a suitable immiscible solvent, when there will be obtained:—		The Immiscible Layer will contain *hydrocarbons, oils, various acids, resins, colouring matters, phenols, glucosides,* &c., which may be further separated by agitating the liquid with water containing caustic soda, when there will be obtained:—	
In the Alkaline Aqueous Liquid— *Carbohydrates;* as sugars, gums, dextrin. *Soluble Alcohols;* as methyl alcohol, ethyl alcohol, glycerin. *Soluble Acids;* as acetic, oxalic, lactic, malic, tartaric, sulphophenic. *Certain Alkaloids or Organic Bases;* as curarine, urea, glycocine, solanine, and possibly cinchonine, morphine, and pyridine. *Certain Colouring Matters;* as indigo products. *Proteids and their Allies;* as albumin, casein, gelatin.	In the Immiscible Layer— *Most Vegetable Alkaloids;* as quinine, strychnine, aconitine, atropine, nicotine, (cinchonine, morphine, the last two with difficulty). *Coal Tar Bases;* as aniline and its homologues (rosaniline), chrysotoluidine (pyridine), homologues of pyridine.	In the Alkaline Aqueous Liquid— *Fatty Acids;* as stearic, oleic, valeric. *Various other Acids,* as benzoic, salicylic, phthalic, meconic. *Acid Dyes and Colouring Matters;* as picric and chrysophanic acids, alizarin, aurin, bilirubin. *Acid Resins;* as colophony. *Phenols;* as carbolic and cresylic acids, thymol, creasote. *Certain Glucosides, &c.;* as santonin, cantharidin, picrotoxin.	In the Immiscible Layer— *Solid Hydrocarbons;* as paraffin, naphthalene, anthracene. *Liquid Hydrocarbons;* as petroleum products, rosin-oil, benzene. *Essential Oils;* as turpentine. *Nitro-compounds;* as nitrobenzene. *Ethers and their Allies;* as ether, chloroform, compound ethers, nitro-glycerin. *Fixed Oils, Fats, and Waxes.* *Neutral Resins and Colouring matters.* *Camphors;* as laurel-camphor, borneol, menthol. *Alcohols* insoluble or nearly insoluble in water; as amyl and cetyl alcohols, cholesterin. *Certain Glucosides, &c.;* as saponin, digitalin, santonin. *Certain Weak Alkaloids;* as caffeine, colchicine, narcotine, piperine, theobromine.

TABLE SHOWING INDICATIONS GIVEN BY LITMUS, METHYL-ORANGE, PHENACETOLIN, PHENOLPHTHALEIN AND ROSOLIC ACID WITH VARIOUS SALTS OF ALKALIES (M = K or Na, not Am) WITH AMMONIA AND WITH SOME ACIDS. (FROM R. T. THOMPSON'S RESULTS.)

Indicator.	MHO.	M_2CO_3	$MHCO_3$.	M_2CO_3 MHO together.	M_2CO_3 $MHCO_3$ together.	Free Ammonia.
Litm.	Sharp	M_2O Boil.	M_2O Boil.	Met.-org. in cold gives total M_2O. Add excess of $BaCl_2$ to dilute cold solution of separate quantity and use Ph.-ph. without filtration. MHO only is indicated.	Tot. Alk. by Met.-org. on separate quantity. Add known MHO in excess to separate quantity, and determine MHO by $BaCl_2$ and Ph.-ph. in cold. The MHO which disappears converts $MHCO_3$ into M_2CO_3.	Good results.
Met.-org.	Sharp Cold	M_2O Cold	M_2O Cold			
Ph.-acet.						
Ph.-phth.	Sharp	M_2O Boil.	Neutral Cold, M_2O Boil.			Useless.
Ros. acid.	Sharp	M_2O Boil.	M_2O Boil.			Fair.

TABLE SHOWING INDICATIONS, &c.—*continued.*

Indicator.	$M_2S_2O_3$.	M_2SO_3. $MHSO_3$.	M_2S.	M_3PO_4.	M_2HPO_4	M Silicate.	M Aluminate.	M Borates.	M_3AsO_4	$NaAsO_2$.
Litm.	Neutral.	$\frac{1}{2}M_2O$ of M_2SO_3 ind. $MHSO_3$ neutral. Me.-org. best.	Good boiling	$\frac{2}{3}M_2O$ but Me.-org. sharpest, others indistinct. Ph.-ac. two changes.	$\frac{1}{2}M_2O$ Me.-org. sharpest.	Sharp.	High indistinct.	Indistinct.	Slow indistinct $\frac{2}{3}M_2O$	Good Total M_2O indicated.
Met.-org.			Good cold			Sharp.	Sharp.	Good.	$\frac{2}{3}M_2O$	
Ph.-ac.			Good boiling			Indistinct.	Good.	Indistinct.	Same as litm.	
Ph.-phth.		M_2SO_3 neutral cold.	$\frac{1}{2}M_2O$ cold	$\frac{1}{3}M_2O$ cold	Almost neutral.	Low.		Useless.	$\frac{1}{3}M_2O$	Low
Ros. acid.			M_2O boiling	$\frac{2}{3}M_2O$ indistinct.	$\frac{1}{2}M_2O$ indistinct.	Sharp boiling.	High.	Indistinct.	Same as litm.	Same as litm.

TABLE SHOWING INDICATIONS, &c.—*continued.*

Indicator.	HCl, HNO_3 H_2SO_4.	$\left\{ \begin{array}{l} COHO \\ COHO. \end{array} \right.$	$\left\{ \begin{array}{l} CH_3 \\ COHO. \end{array} \right.$	Tartaric Acid.	Citric Acid.	Remarks.
Litm.	Good boiling.	Sharp.	Low.	Fair.	Low.	Acids change blue to red; alkalies turn red to blue. Aq. soln.
Me.-Org.	Good cold.	Useless.	Useless.	Useless.	Useless.	Yellow when alkaline; pink with acid; MCl, M_2SO_4, MNO_3 decrease sharpness; useless with nitrites. Alcoh. soln.
Ph.-ac.	Good if carb. present.	Low.	Low.	Low.		Faint yellow with MHO; dark pink with M_2CO_3 and NH_3, more intense with $MHCO_3$; golden yellow with acids. Alcoh. soln.
Ph.-phth.	Good boiling.	Sharp.	Sharp.	Good.	Sharp.	Colorless when acid or neutral; fine red when alkaline. Alcoh. soln.
Ros.-ac.	Good boiling.	Sharp.	Useless.	Fair.	Useless.	Pale yellow to pink by alkali; am. salts decrease sharpness. Alcoh. soln.

PHOTOGRAPHIC SECTION.

Every care has been taken in choosing the matter for this section to select only such Tables and Formulæ as are given on good authority, or have been found useful from personal experience.

It is scarcely necessary to point out that much information of value to photographers is to be found in the sections on Weights and Measures, Thermometry, &c., in the body of the work.

In order to avoid the errors and confusion which often result from the similarity of the contraction for grains and grammes, the symbol G signifying gramme or grammes has been adopted, and the use of this symbol will be extended in future editions of the Pocket-book.

Grains are indicated by gr. or grns.

TABLE SHOWING THE EQUIVALENCE OF VARIOUS SALTS USED IN PHOTOGRAPHY.

	Ammonium Bromide.	Potassium Bromide.	Sodium Bromide.	Cadmium Bromide. (Coml.)	Cadmium Bromide. (Anhyd.)	Zinc Bromide.	Ammonium Chloride.	Sodium Chloride.	Ammonium Iodide.	Potassium Iodide.	Sodium Iodide.	Cadmium Iodide.	Silver Nitrate	Silver Compound produced.
Ammonium bromide	1	·823	·951	·57	·72	·87	1·832	1·675	·676	·59	·653	·535	1·734	1·918
Potassium ,,	1·215	1	1·156	·692	·876	1·058	2·226	2·036	·821	·717	·794	·651	1·427	1·578
Sodium ,,	1·051	·865	1	·599	·757	·915	1·925	1·761	·71	·62	·686	·563	1·650	1·825
Cadmium ,, com.	1·755	1·444	1·67	1	1·265	1·527	3·215	2·94	1·186	1·035	1·146	·94	·988	1·093
,, ,, anh.	1·387	1·141	1·32	·79	1	1·207	2·542	2·324	·938	·819	·906	·743	1·25	1·382
Zinc ,,	1·149	·945	1·093	·655	·828	1	2·104	1·925	·776	·678	·75	·615	1·509	1·670
Ammonium chloride	·546	·449	·519	·311	·393	·475	1	·914	·369	·322	·356	·292	3·177	2·682
Sodium ,,	·597	·491	·568	·34	·43	·519	1·093	1	·403	·352	·39	·319	2·906	2·453
Ammonium iodide..	1·479	1·217	1·408	·843	1·066	1·287	2·712	2·478	1	·873	·966	·792	1·172	1·620
Potassium ,,	1·695	1·394	1·612	·965	1·221	1·475	3·104	2·839	1·145	1	1·107	·907	1·023	1·415
Sodium ,,	1·53	1·259	1·456	·872	1·103	1·332	2·803	2·564	1·034	·903	1	·819	1·133	1·566
Cadmium ,,	1·867	1·536	1·776	1·064	1·345	1·625	3·42	3·128	1·262	1·102	1·22	1	·929	1·284
Silver nitrate	·576	·700	·606	1·012	·800	·663	·315	·344	·853	·977	·882	1·076	1	—
Soluble compound required	·521	·633	·548	·915	·723	·600	·373	·408	·617	·707	·638	·778	—	—

Weight of silver chloride produced ·844; of silver bromide 1·106; of silver iodide 1·382.

TABLE FOR ENLARGEMENT OR DIMINUTION.

Focus of Lens.	Reduction.	Times of Enlargement or Reduction.								Enlargement.	Remarks.
		1	2	3	4	5	6	7	8		
in.											
2	u	4	6	8	10	12	14	16	18	v	v = distance of image and u = distance of object from optical centre.
	v	4	3	$2\frac{3}{4}$	$2\frac{1}{2}$	$2\frac{2}{5}$	$2\frac{1}{3}$	$2\frac{2}{7}$	$2\frac{1}{4}$	u	
$2\frac{1}{2}$	u	5	$7\frac{1}{2}$	10	$12\frac{1}{2}$	15	$17\frac{1}{2}$	20	$22\frac{1}{2}$	v	
	v	5	$3\frac{3}{4}$	$3\frac{1}{3}$	$3\frac{1}{8}$	3	$2\frac{11}{12}$	$2\frac{6}{7}$	$2\frac{13}{16}$	u	
3	u	6	9	12	15	18	21	24	27	v	
	v	6	$4\frac{1}{2}$	4	$3\frac{3}{4}$	$3\frac{3}{5}$	$3\frac{1}{2}$	$3\frac{3}{7}$	$3\frac{3}{8}$	u	
$3\frac{1}{2}$	u	7	$10\frac{1}{2}$	14	$17\frac{1}{2}$	21	$24\frac{1}{2}$	28	$31\frac{1}{2}$	v	
	v	7	$5\frac{1}{4}$	$4\frac{2}{3}$	$4\frac{3}{4}$	$4\frac{1}{5}$	$4\frac{1}{12}$	4	$3\frac{15}{16}$	u	
4	u	8	12	16	20	24	28	32	36	v	
	v	8	6	$5\frac{1}{4}$	5	$4\frac{4}{5}$	$4\frac{2}{3}$	$4\frac{4}{7}$	$4\frac{1}{2}$	u	
$4\frac{1}{2}$	u	9	$13\frac{1}{2}$	18	$22\frac{1}{2}$	27	$31\frac{1}{2}$	36	$40\frac{1}{2}$	v	
	v	9	$6\frac{3}{4}$	6	$5\frac{5}{8}$	$5\frac{2}{5}$	$5\frac{1}{4}$	$5\frac{1}{7}$	$5\frac{1}{16}$	u	
5	u	10	15	20	25	30	35	40	45	v	
	v	10	$7\frac{1}{2}$	$6\frac{2}{3}$	$6\frac{1}{4}$	6	$5\frac{5}{6}$	$5\frac{5}{7}$	$5\frac{5}{8}$	u	
$5\frac{1}{2}$	u	11	$16\frac{1}{2}$	22	$27\frac{1}{2}$	33	$38\frac{1}{2}$	44	$49\frac{1}{2}$	v	
	v	11	$8\frac{1}{4}$	$7\frac{1}{3}$	$6\frac{7}{8}$	$6\frac{1}{2}$	$6\frac{5}{12}$	$6\frac{2}{7}$	$6\frac{3}{16}$	u	
6	u	12	18	24	30	36	42	48	54	v	
	v	12	9	8	$7\frac{1}{2}$	$7\frac{1}{6}$	7	$6\frac{6}{7}$	$6\frac{3}{4}$	u	
$6\frac{1}{2}$	u	13	$19\frac{1}{2}$	26	$32\frac{1}{2}$	39	$45\frac{1}{2}$	52	56	v	
	v	13	$9\frac{3}{4}$	$8\frac{2}{3}$	$8\frac{1}{8}$	$7\frac{4}{5}$	$7\frac{7}{12}$	$7\frac{3}{7}$	7	u	

Table for Enlargement or Diminution—*continued.*

Focus of Lens.	Reduction.	Times of Enlargement or Reduction. 1	2	3	4	5	6	7	8	Enlargement.	Remarks.
in.]											
7	u	14	21	28	35	42	49	56	63	v	v = distance of image and u = distance of object from optical centre.
	v	14	$10\frac{1}{2}$	$9\frac{1}{3}$	$8\frac{3}{4}$	$8\frac{2}{5}$	$8\frac{1}{6}$	8	$7\frac{7}{8}$	u	
$7\frac{1}{2}$	u	15	$22\frac{1}{2}$	30	$37\frac{1}{2}$	45	$52\frac{1}{2}$	60	68	v	
	v	15	$11\frac{1}{4}$	10	$9\frac{3}{8}$	9	$8\frac{3}{4}$	$8\frac{4}{7}$	$8\frac{1}{2}$	u	
8	u	16	24	32	40	48	56	64	72	v	
	v	16	12	$10\frac{2}{3}$	10	$9\frac{3}{5}$	$9\frac{1}{3}$	$9\frac{1}{7}$	9	u	
$8\frac{1}{2}$	u	17	$25\frac{1}{2}$	34	$42\frac{1}{2}$	51	$59\frac{1}{2}$	68	77	v	
	v	17	$12\frac{3}{4}$	$11\frac{1}{3}$	$10\frac{5}{8}$	$10\frac{1}{5}$	$9\frac{7}{12}$	$9\frac{5}{7}$	$9\frac{5}{8}$	u	
9	u	18	27	36	45	54	63	72	81	v	
	v	18	$13\frac{1}{2}$	12	$11\frac{1}{4}$	$10\frac{7}{8}$	$10\frac{1}{2}$	$10\frac{2}{7}$	$10\frac{6}{8}$	u	
$9\frac{1}{2}$	u	19	$28\frac{1}{2}$	38	$47\frac{1}{2}$	57	$66\frac{1}{2}$	76	86	v	
	v	19	$14\frac{1}{4}$	$12\frac{2}{3}$	$11\frac{7}{8}$	$11\frac{2}{5}$	$11\frac{1}{12}$	$10\frac{6}{7}$	$10\frac{5}{8}$	u	
10	u	20	30	40	50	60	70	80	90	v	
	v	20	15	$13\frac{1}{3}$	$12\frac{1}{2}$	12	$11\frac{2}{3}$	$11\frac{3}{7}$	$11\frac{1}{4}$	u	
$10\frac{1}{2}$	u	21	$31\frac{1}{2}$	42	$52\frac{1}{2}$	63	$73\frac{1}{2}$	84	95	v	
	v	21	$15\frac{2}{3}$	14	$13\frac{1}{8}$	$12\frac{3}{5}$	$12\frac{3}{4}$	12	$11\frac{7}{8}$	u	
11	u	22	33	44	55	66	77	88	99	v	
	v	22	$16\frac{1}{2}$	$14\frac{2}{3}$	$13\frac{3}{4}$	$13\frac{1}{3}$	$12\frac{5}{6}$	$12\frac{4}{7}$	$12\frac{3}{8}$	u	
$11\frac{1}{2}$	u	23	$34\frac{1}{2}$	46	$57\frac{1}{2}$	69	$80\frac{1}{2}$	92	104	v	
	v	23	$17\frac{1}{4}$	$15\frac{1}{3}$	$14\frac{3}{8}$	$13\frac{4}{5}$	$13\frac{5}{12}$	$13\frac{1}{7}$	13	u	
12	u	24	36	48	60	72	84	96	108	v	
	v	24	18	16	15	$14\frac{2}{5}$	14	$13\frac{5}{7}$	$13\frac{1}{2}$	u	

FORMULÆ FOR PREPARATION OF PYROXYLINE.

	Sulphuric Acid.	Nitric Acid (or Nitre).	Water.	Dry Cotton Wool (purified).	Remarks.
1. Metrical .. English ..	219 c.c. 7½ fl. ℥ S.G. 1·845	73 c.c. 2¼ fl. ℥ S.G. 1·457	57·5 c.c. 2 fl. ℥	10 G. 150 grns.	Hardwick's formula.
2. Metrical .. English ..	219 c.c. 7½ fl. ℥ S.G. 1·845	83 c.c. 2¾ fl. ℥ S.G. 1·45	51·5 c.c. 1¾ fl. ℥	10 G. 150 grns.	Hardwick's formula.
3. Metrical .. English ..	425 c.c. 14½ fl. ℥ S.G. 1·84	248 G. 8½ oz. potash nitre	71 c.c. 2½ fl. ℥	10 G. 150 grns.	Hardwick's formula.
4. Metrical .. English ..	282 c.c. 9¾ fl. ℥ S.G. 1·84	188 c.c. 6½ fl. ℥ S.G. 1·36	.. ..	10 G. 150 grns.	Simpson's formula.
5. Metrical .. English ..	262 c.c. 9 fl. ℥	174 c.c. 6 fl. ℥	75 c.c. 19 ℥	10 G. 150 grns.	Warnerke's formula. (see note)

NOTE.—The wool should be purified by digestion with sodium carbonate, washed and dried. The acid should be at a temp. of 150° F. = 65·5° C. when the wool is immersed. In Warnerke's form. the wool is previously impregnated with 3 G. or 46 grains respectively of gelatin.

VARIOUS FORMULÆ FOR IODIZED COLLODION.

	No. 1.		No. 2.		No. 3.		No. 4.	
Ammonium iodide	—	—	—	—	35 gr.	2·0 G.	30 gr.	1·76 G.
Cadmium "	45 gr.	2·90 G.	36 gr.	2·05 G.	—	—	5 gr.	29 G.
Ammonium bromide	—	—	—	—	—	—	16·5 gr.	8·8 G.
Cadmium "	20 gr.	1·14 G.	20 gr.	1·14 G.	10·8 gr.	·62 G.	—	—
Collodion	10 oz.	250 c.c.	10 oz	250 c.c.	10 oz.	250 c.c.	10 oz.	250 c.c.

	No. 5.		No. 6.		No. 7.	
Ammonium iodide	16·6 gr.	·88 G.	40 gr.	2·5 G.	—	—
Cadmium "	22·5 gr.	1·33 G.	—	—	44 gr.	2·5 G.
Ammonium bromide	—	—	—	—	—	—
Cadmium "	20 gr.	1·15 G.	—	—	—	—
Collodion	10 oz.	250 c.c.	10 oz.	250 c.c.	10 oz.	250 c.c.

FORMULÆ FOR WET-PLATE DEVELOPERS.

	No. 1.		No. 2.	
Ferrous sulphate crys.	110 grns. or	8 G.	225 grns. or	14 G.
Glacial acetic acid ..	¼ oz.	„ 8 c.c.	225 „	„ 14 „
Alcohol	1 „	„ 30 „	—	—
Water	8 „	„ 250 „	9 oz.	„ 250 c.c.
Copper sulphate crys.	—	—	21 grns.	„ 1·3 G.

These formulæ are given as indicating the general nature of the developers made with ferrous salts. These developers vary greatly in strength and composition. Increase in the amount of ferrous salts increases the intensity of their action and *vice versâ.*

INTENSIFIER FOR WET PLATES.

Sol. 1.	Pyrogallic acid	30 grns.	or 1·8 G.
	Water..	10 oz.	„ 250 cc.
Sol. 2.	Silver nitrate	10 grns.	„ ·6 G.
	Citric acid	20 „	„ 1·2 „
	Acetic acid..	1 ʒ	„ 3·6 „
	Water..	1 oz.	„ 25 c.c.

Mix a few drops of Sol. 2 with enough of Sol. 1 to well cover the plate.

FIXING SOLUTION FOR WET AND DRY PLATES.

Sodium thiosulphate (hypo) ..	1½ oz.	or 42 G.
Water	9 „	„ 250 c.c.

FORMULA FOR A NEGATIVE VARNISH.

Sandarac	1¼ oz.	or 35½ G.
Alcohol	8½ „	„ 227 „
Oil of lavender	1 „	„ 28 „
Chloroform	1½ dr.	„ 6 „

FORMULA FOR A NEGATIVE VARNISH.

Sandarac	1¾ oz.	or 35 G.
Turpentine oil	¾ „	„ 17·6 „
Lavender oil	¼ „	„ 7·2 „
Alcohol	10 „	„ 250 c.c.

Formula for a Retouching Varnish.

Sandarac	1½ oz.	or 42	G.
Castor oil	120 grns.	„ 7·75	„
Absolute Alcohol	9 oz.	„ 250	c.c.

Formulæ for Varnish to Imitate Ground Glass.

(1.)

Sandarac	360 grns.	or 25 G.
Mastic	80 „	„ 6 „
Ether	8 oz.	„ 250 c.c.
Benzole	2 to 6 oz.	„ 60 to 200 c.c.

The effect produced depends upon the amount of the benzole.

(2.)

A solution of white wax in ether.

Various Pyrogallol Developers for Gelatin Plates.

Calculated by Mr. Geo. Marsh Jones.

It is assumed that the solutions when made up according to the maker's formulæ measure the following quantities.

	No. 1. ℥	No. 2. ℥	No. 3. ℥
1. "Maudsley's studio"	110	80	—
2. „ other form. concd. ..	8	8	—
3. „ „ „ diluted ..	16	16	—
4. London ordinary	1	1	1
5. „ instantaneous	2	3	—
6. Newark extra sensitive	16	16	—
7. Kingston special	8	8	—
8. Clarke's	10	6, 8 or 10.	
9. "Britannia" or La Brillantine ..	6	20	—

Note.—No. 4 Plates. Begin development with ℥ 1 (30 c.c.) of No. 1 Solution, and ♏ 3 (3 drops) each of Solutions 2 and 3; more of No. 2 to follow.

No. 5 Plates. Soak in water, then apply pyro. solution ℥ 2 and begin with ♏ 5 of ammonia; after lights are out ♏ 15 to ♏ 20 more of ammonia solution.

No. 7 Plates. Dilute ℥ 1 of each solution with ℥ 15 water, and use equal quantities of each.

No. 1 Solution.

	No. 1.		No. 2.		No. 3.	
Pyrogallol	39·7 gr.	2·27 G.	547 gr.	31·19 G.	ʒ 5 of No. 2 diluted to ℥ 10.	15·6 c.c. of No. 2 diluted to 250 c.c.
Glycerol ..	—	—	—	—		
Alcohol (meth.) to	—	—	—	—		
Nitric acid (1·142)	—	—	—	—		
Citric acid	5·5 gr.	·32 G.	150 gr.	8·56 G.		
Ammonium bromide	—	—	—	—		
Hard water	to ℥ 10	250 c.c.	℥ 10	250 c.c.		

	No. 4.		No. 5.		No. 6.	
Pyrogallol	20 gr.	1·14 G.	30 gr.	1·71 G.	20 gr.	1·14 G.
Glycerol ..	—	—	—	—	—	—
Alcohol (meth.) to	Freshly mixed		—	—	—	—
Nitric acid (1·42)			—	—	—	—
Citric acid	—	—	—	—	—	—
Ammonium bromide	—	—	—	—	—	—
Hard water	to ℥ 10	250 c.c.	℥ 10	250 c.c.	℥ 10	250 c.c.

	No. 7.		No 8.		No. 9.	
Pyrogallol	547 gr.	31·19 G.	40 gr.	2·28 G.	729 gr.	41·59 G.
Glycerol	℥ 1 ʒ 5 ♏ 20	41·65 c.c.	—	—	—	—
Alcohol (meth.) to	℥ 10	250 c.c.	—	—	—	—
Nitric acid (1·42)	—	—	—	—	33 ♏	·96 c.c.
Citric acid	—	—	4 gr.	2·28 G.	—	—
Ammonium bromide	—	—	—	—	1000 gr.	57 G.
Hard water	to —	—	℥ 10	250 c.c.	℥ 10	250 c.c.

No. 2 Solution.

	No. 1.		No. 2.		No. 3.	
Ammonia S.G. ·880	ʒ 1	3·12 c.c.	℥ 1 ʒ 7	46·9 c.c.	ʒ 5 of No. 2 diluted to ℥ 10.	15·6 c.c. of No. 2 diluted to 250 c.c.
Ammonium bromide	—	—	ʒ 7·5 to ʒ 10	25 to 35 c.c.		
Potassium bromide	20 gr.	1·14 G.	—	—		
Glycerol ..	—	—	—	—		
Water to ..	℥ 10	250 c.c.	℥ 10	250 c.c.		
	No. 4.		**No. 5.**		**No. 6.**	
Ammonia S.G. ·880	ʒ 10	31·24 c.c.	℥ 3 ʒ 2 ♏ 40	83·32 c.c.	♏ 122·5	5·86 c.c.
Ammonium bromide	—	—	—	—	37·5 gr.	2·14 G.
Potassium bromide	—	—	ʒ 3 20 gr.	11·41 G.	—	—
Glycerol ..	—	—	—	—	—	—
Water to ..	℥ 10	250 c.c.	℥ 10	250 c.c.	℥ 10	250 c.c.
	No. 7.		**No. 8.**		**No. 9.**	
Ammonia S.G. ·880	ʒ 10	31·24 c.c.	♏ 100 to ʒ 1.	3 to 5 c.c.	♏ 90	4·7 c.c.
Ammonium bromide	—	—	20 to 33 gr.	1·1 to 2 G.	—	—
Potassium bromide	250 gr.	14·26 G.	—	—	—	—
Glycerol ..	ʒ 10	31 cc.	—	—	—	—
Water to ..	℥ 10	250 c.c.	℥ 10	250 c.c.	℥ 10	250 c.c.

No. 3 Solution.

This is required for No. 4 (London ordinary) and consists of

Potassium bromide	150 gr.	or	8·55 G.
Water to	℥ 10		250 c.c.

Abney's Solution for Removing Green Fog from Gelatin Negatives.

Iron perchloride	50 grns. or 3 G.	
Potassium bromide..	30 „ „ 2 „	
Water	4 oz. „ 100 c.c.	

For Reducing Density of Gelatin Negatives.

Dry bleaching powder	1 part.
Potassium carbonate	2 parts.
Water	20 „

Mix the bleaching powder with three-fourths of the water, dissolve the carbonate in the remainder, mix, boil, and filter.

Clearing Solution for Gelatin Plates.

(To remove pyro. stains after developing.)

Alum	2 oz. or 50 G.
Citric acid	1 „ „ 25 „
Water	10 „ „ 250 c.c.

Intensifiers for Gelatin Plates.

(1.)

Sulphate of iron and ammonium	1 oz. or 25 G.
Loaf sugar	1 „ „ 25 „
Glacial acetic acid	2 „ „ 50 c.c.
Albumen (1 egg)	1 „ „ 25 G.
Water dist...	20 „ „ 500 c.c.

A few drops of silver nitrate solution, 4 grns. per oz. or 2 G. per 100 c.c., must be used with this intensifier.

(2.)

Mercuric chloride (corrosive sublimate)..	200 grns. or 12 G.
Ammonium chloride	200 „ „ 12 „
Water	10 oz. „ 250 c.c.

Followed by ammonia solution: 10 drops ammonia (·880) to 1 oz. or 30 c.c.

(3.)

Uranium nitrate	30 grns.	or 2 G.
Potassium ferricyanide (red prussiate)	30 ,,	,, 2 ,,
Water	8 oz.	,, 250 c.c.

In all cases the negative must be washed perfectly free from thiosulphate before intensification.

Solutions for Preparing Sensitive Paper.

For *albumenizing:*

Ammonium chloride	200 to 400 grns.	or 6 to 12 G.
Alcohol	½ oz.	,, 15 c.c.
Water	9 ,,	,, 250 ,,
Albumen	30 ,,	,, 500 ,,

Add the albumen when the other ingredients are dissolved, shake well, and filter through a bit of sponge.

For *sensitizing:*

Silver nitrate	1 oz.	or 28 G.
Water	9 ,,	,, 250 c.c.

The amount of nitrate should be less in printing from a hard negative, and increased when the negative is weak. Paper floated after sensitizing on a bath of citric acid (2 G. per 30 c.c. water) will keep longer than ordinary paper.

Formulæ for Toning Baths.

(1.)

Gold chloride	1 grn.	or ·1 G.
Sodium acetate	30 grns.	,, 2·5 ,,
Water	10 oz.	,, 300 c.c.

This gives warm tones and must not be used until one day old. Wash prints well previous to toning.

(2.)

Gold chloride	1 grn.	or ·1 G.
Sodium bicarbonate	8 grns.	,, ·5 ,,
Water	10 oz.	,, 300 c.c.

This must be used at once.

(3.)

Gold chloride	1 grn. or	·1 G.
Sodium diphosphate	20 grns. ,,	1·3 ,,
Water	10 oz. ,,	300 c.c.

This gives rich purple tones, but will not keep long.

(4.)

Gold chloride	1 grn. or	·1 G.
Bleaching powder	1 ,, ,,	·1 ,,
Water	8 oz. ,,	300 c.c.

Raise to boiling, and add a slight excess of precipitated chalk, filter, and cool. This may be used immediately and will keep.

(5.)

(*a*)	Gold chloride	1 grn. or	·1 G.
	Water	10 oz. ,,	300 c.c.
(*b*)	Borax	100 grns. or	8 G.
	Water	10 oz. ,,	300 c.c.

Mix equal volumes of *a* and *b*. The solutions *a* and *b* will keep, but the mixture, which can be used at once, will not keep. Wash the prints well before toning.

Formula for Fixing Prints.

Sodium thiosulphate (hypo.)	4 oz. or	100 G.
Water	1 pint ,,	500 c.c.

Formula for Printing in Blue. White Lines on Blue Ground.

Potassium ferricyanide	5 oz. or	150 G.
Ammonio-citrate of iron ..	5 ,, ,,	150 ,,
Water	20 ,, ,,	600 c.c.

Dissolve each of the salts in half the water, mix, and coat one side of the paper. Expose to light and develop by floating in water.

Pellet's Process for Printing in Blue on a White Ground, is said to be :—

Common salt	3 oz.	or 85 G.
Iron perchloride	8 ,,	,, 227 ,,
Tartaric acid	$3\frac{1}{4}$,,	,, 92 ,,
Water	100 ,,	,, 3 litres.
Gum arabic	25 ,,	,, 700 G.

Dissolve the gum in half of the water and mix. Coat well-sized paper with the mixture in a dim light and dry rapidly. Expose and float on a saturated solution of potassium ferrocyanide. Float on clean water for a few minutes and then upon

Hydrochloric acid..	8 parts.
Sulphuric acid	3 ,,
Water	100 ,,

Then wash with water and dry.

Encaustic Paste.

(1.)

White beeswax	500 grns.	or 50 G.
Gum elemi	10 ,,	,, 1 ,,
Benzole .. ., ...	220 ,,	,, 22 ,,
Oil of lavender	330 ,,	,, 33 ,,
Oil of spike	50 ,,	,, 5 ,,

(2.)

White wax	1 part.
Oil of turpentine	1 ,,

Solutions for Mounting Prints.

(1.)

Gelatin..	8 oz.	or 80 G.
Water	30 ,,	,, 300 c.c.
Glycerin	2 ,,	,, 20 G.
Alcohol (meth.)..	10 ,,	,, 100 c.c.

Add the spirit last.

(2.)

Gelatin	1 part.
Alcohol (meth.)	10 parts.

Swell the gelatin with water and boil with the alcohol.

INDEX.

APPENDIX.

LONDON: PRINTED BY WILLIAM CLOWES AND SONS, LIMITED, STAMFORD STREET AND CHARING CROSS.

Among the more important of the subjects treated of are the following:—

Acids.
Alcohol.
Alcoholic Liquors.
Alkalies.
Alloys.
Alum.
Asphalt.
Assaying.
Beverages.
Blacking.
Blacks.
Bleaching Powder.
Bleaching.
Candles.
Carbon Bisulphide.
Celluloid.
Cements.
Clay.
Coal-tar Products.
Cocoa.
Coffee.
Cork.
Cotton Manufactures.
Drugs.
Dyeing and Calico Printing.
Dyestuffs.
Electro-Metallurgy.
Explosives.
Feathers.
Fibrous Substances.
Floor-cloth.
Food Preservation.
Fruit.
Fur.
Gas, Coal.
Gems.
Glass.
Graphite.
Hair.
Hair Manufactures.
Hats.
Honey.
Hops.
Horn.
Ice.
Indiarubber Manufactures.
Ink.
Ivory.
Jute Manufactures.
Knitted Fabrics—Hosiery
Lace.
Leather.
Linen Manufactures
Manures.
Matches.
Mordants.
Narcotics.
Nuts.
Oils and Fatty Substances.
Paint.
Paper.
Paraffin.
Pearl and Coral.
Perfumes.
Photography.
Pigments.
Pottery.
Printing and Engraving.
Rags.
Resinous and Gummy Substances.
Rope
Salt.
Silk.
Silk Manufactures.
Skins.
Small Goods.
Soap.
Spices.
Sponge.
Starch.
Sugar.
Sulphur.
Tannin.
Tea.
Timber.
Varnish.
Vinegar.
Wax.
Wool.
Woollen Manufactures.
